IJAAAR 4 (1&2): 59-66,2007 *International Journal of Applied Agricultural and Apicultural Research*
(C) Faculty of Agricultural Sciences, Lautech, Ogbomoso, Nigeria, 2007

Analysis of Technology Use and Limitation in Cassava Production in Esan Central Local Government Area of Edo State, Nigeria

Omoregbee, F.E. and D.U. Okoedo-Okojie

Dept ofAgric Economics and Extension Services, Faculty of Agriculture, University of Benin, Benin City, Edo State, Nigeria. E:mail: omo_dz ©yahoo.com

Abstract

The study investigated technology use and limitation in cassava production in Esan central local government area of Edo State, Nigeria. It equally assessed the relationship between farmers' personal factors and use of new technologies. Analysis of 88 completed interview schedules from farmers revealed that the average percentage level of awareness and adoption of the recommended technologies associated with cassava production were 46% and 21% respectively, indicating a low level of extension effectiveness. The average number of technologies adopted by respondents was 3 out of 8, representing an adoption performance of 38%. Neglect by extension agents ($\overline{X}$ =4.75) and non - availability of improved cassava cuttings ($\overline{X}$ =4.29) were considered by farmers as serious technology limitation; while farmers[1] use of the technologies was significantly related to their educational status (b =0.145) and contact with extension workers (b = 0.156). The Edo State ADP should improve its information dissemination methods so as to create better awareness of improved technologies in cassava production among farmers. Efforts should be made on the part of the Edo ADP to encourage farmer-to-farmer extension to complement extension services effort.

Key words: - Technology, Adoption, Limitation, Cassava production

Introduction

In Nigeria, cassava has assumed a prominent role as one of the major staple foods among the rural and urban dwellers. As a result of the high demand for the major product - gam, cassava now forms a major crop in the crop combination of most farmers. Cassava production according to Windapo (2000) has been increasing among villages where cassava, yam, rice, beans were the most important crops (based on farmers ranking) in the cropping system. This means that cassava is replacing these major crops in those villages.

As import substitution becomes prominent in the industrial sector of the economy, cassava use in the industry and livestock feeds is rapidly expanding. The demand for cassava in the foreseeable future will exceed its supply, considering the recently constituted 20-man cassava committee by the-Federal Government of Nigeria. The committee is expected to put in place measures for generating at least seven billion naira, annually from cassava export. In order to achieve this goal, the

role of technology in promoting cassava production cannot be overemphasized. Several technologies have been developed for the enhancement of cassava production in the country and Edo State in particular. A gap exists between the development and the adoption of these technologies by cassava farmers. Various reports indicated that the yield levels achievable in small farms have continued to be far below the yield levels achievable at agricultural research stations in Nigeria (Ajala 1992; Ekumakama and Nwankwo, 2002; and Ogunsumi et at. 2002). Many reasons have been given for this state of affairs. The average yield of cassava in Africa (6.4 tons/ha), FAO (1996) claims, is well bellow the world average yield of 8.8 tons/ha.

It is argued that one reason for the low yield recorded in cassava production is because farmers fail to take advantage of improved agricultural technologies and information (Ekumakama and Nwankwo, 2002). However, their study was conducted in Abia state. The relevant question to ask is to what extent have the cassava production technologies been utilized among cassava farmers in Esan Central Local Government Area?

Objectives of study

The general objective of the study is to determine the extent of use by the farmers of improved cassava production technologies transmitted through the extension service of the Edo State Agricultural Development Program (ADP) in Esan Central Local Government Area. The specific objectives are to;

i. examine the level of awareness, extent of use and discontinuance of improved cassava production technologies by farmers,
ii. ascertain the limitations on use of the improved production technologies by farmers,
iii *analyze* factors associated with the use of improved cassava production technologies by farmers.

Methodology

The study area is Esan Central Government Area (LGA) of Edo State, Nigeria; Esan Central LGA is one of the five extension blocks in the Edo Central Agricultural In this study, attention was focused on cells within the extension block where cassava is the major crop in the cropping mixture. Hence, purposive sampling technique was in selecting four cells from the chosen extension block. These were Irrua, Ewu Usugbenu and Opoji From these cells, four cells were randomly selected and finally twenty-two farmers were randomly selected from each sub-cell giving a total of eighty-eight respondents.

Primary data for the study were sourced from the sample of 88 farmers by mean interview schedule. Validation of the c collection instrument was accomplished thro expert consultation with experts in the field Agricultural extension, while its reliability (r=0.73) was ascertained through the test - retest method. The instrument solicited information on such personal characteristics the farmers such as sex, education level, farm size and contact with extension agents. Eight aspects of cassava production technologies were investigated namely, improved varieties; chemical weeding; fertilizer application; spacing;

chips/pellets; flour; starch; tube storage in trenches/moist saw dust.

Measurement of variables

Adoption: Each respondent's adoption w£ calculated by scoring the production technologies: one (1) for adoption of the technology and zero (0) if otherwise. The maximum score obtainable was 8 for the 8 identified technologies disseminated in the study area. Furthermore the average adoption score was used in categorizing farmers into low (i.e Technology use and cassava production average score) and high adopters (above average score).

Data analysis technique

Data analysis was accomplished through use of descriptive statistic (percentage and means) and multiple regression analysis (inferential statistic). The mean score was used in ranking constraints or limitations to farmers' use of improved technologies. The constraints were scaled from one (1) representing "not serious" to 5 representing 'very serious'. A mean score of 3.50 was used to classify the constraints as serious or not serious.

The multiple regression model is implicitly specified as follows

$Y = F(X_1X_2X_3X_4)$,

Where

Y = Adoption index (number of technologies adopted by respondent)

X_1 = sex of farmers

X_2 = educational attainment by farmers (number of years spent in formal schooling)

X_3 = farmers' contact with extension agents(frequency of contact)

X_4 = farmers' farm size (measured in hectares).

Results and Discussion

Table 1: Percentage distribution of respondents according to improved technologies adopted (N = 88)

S/n	Technologies	Aware	Adopted	Discontinued
1	Improved Varieties	60.2	55.7	19.3
2	Chemical Weeding	51.2	-	-
3	Fertilizer application	61.4	14.7	12.5
4	Spacing	56.8	19.3	-
5	Processing into chips/pellets	26.1	17.1	-
6	Processing into flour	44.3	35.2	-
7	Processing into starch	36.4	10.2	3.4
8	Tubers Storage in trenches/moist sawdust	31.8	13.6	-
	Average	46	20.7	

Field Survey data, 2005

Data in Table 1 showed eight (8) cassava production technologies and the distribution of respondents according to level of awareness, use and

discontinuance of the technologies. Percentage levels of awareness for the 8 technologies showed a distribution of 26.1% for cassava processing into chips/pellets to a maximum of 61% in fertilizer application. Four(4) of the eight(8)technologies, the level of awareness was greater than 50% namely improved varieties (60.2%), chemical weeding (51.2%), and fertilizer application (61.4%) and recommended spacing (56.8%). Three of the technologies i.e. cassava processing into chips/ pellets, processing into flour and processing into starch awareness levels were 26.1%, 44.3% and 36.4% respectively.

Percentage distribution of adopters in Table 1 showed that only one (1) of the technologies was markedly adopted with a percentage level of 55.7%. This was improved varieties. Processing of cassava into flour was favoured second with a percentage of 35.2%. The least adopted technologies by farmers were tuber storage in trenches/moist sawdust (13.6%), fertilizer application (14.7%) and cassava processing into starch (10.2%)

The average percentage awareness score for the farmers was 46% while the average percentage adoption score was 20.7%, which was very low. This shows the existence of a gap in farmers' awareness and adoption of improved technologies. Only three (3) of the technologies adopted by farmers were discontinued. These were improved varieties (19.3%), fertilizer application (12.5%) and cassava processing into starch (3.4%). This shows that extension workers concern should not only be limited to farmers use of improved technologies but also to monitor their adoption practice to prevent innovation discontinuance.

Table 2: Percentage distribution of respondents by their level of use of technologies (n = 88)

Number of Technologies Used	**Frequency**	**Percentage**
5	6	6.8
4	16	18.2
3	39	44.3
2	27	30.7
Average	3	37.5
Classification		
Low technology users	22	25.0
High technology users	66	75.0

Field Survey data, 2005

Although eight (8) cassava technologies have been recommended by the ADP to farmers in the study area respondents recorded an average adoption of three (3) technologies representing 37.5% adoption performance. The adoption score ranged from a minimum of two (30.7%) to a maximum of five technologies (6.8%) with the majority adopting three technologies (44.3%). Based on the average adoption score of three technologies, majority or 75% of the

respondents were classified as high technology users while 25% were considered as low users of technologies in cassava production.

Table 3: Percentage distribution of respondents by factors limiting use of cassava production technologies (n = 88)

Constraints	**Degree of Constraints**						
	Very Serious	Serious	Not Quite Serious	Little serious	Not a Problem	Mean Score	Ranking
Neglect by extension Agent	48.8	29.6	12.5	9.1	-	4.75	1
Lack of improved cassava stems	29.6	47.7	98.1	-	1:4.6	4.29	2
Lack of awareness	-	4.6	56.8	17.0	21.6	2.77	3
Limited farm land	-	17.0	35.2	22.7	25.0	2.77	3
Low Price of farm produce	-	3.4	51.1	30.7	14.8	2.76	4
High cost of Input	-	-	40.9	44.3	14.8	2.57	5
Fear of failure	-	13.6	14	12.5	59.1	2.05	6
Difficult to understand usage	-	-	3.4	11.4	85.2	1.34	7

Field Survey data, 2005.

Information in Table 3 showed that cassava production in the study area was constrained by various factors existing in different degrees ranging from 'very serious' to 'not a problem'. It revealed that lack of awareness with a mean score of 2.77; low farm produce price ($\overline{X}$ =2.76), high input cost ($\overline{X}$=2.57) and fear of adoption failure ($\overline{X}$ =2.05) and limited farm land ($\overline{X}$=1.34) were not considered serious limitations to farmers' use of improved production technologies because of having mean score values less than 3.50.

This shows that farmers' reluctance to implement new farm ideas may not necessarily be because they are unaware of such ideas or because of their small farm plots, or their inability to understand the extension message or unwillingness to try new ideas or because of fear of failure. Rather, as observed in this study, the

important constraints include the non availability of improved cassava stems ($\overline{X}$ =4.29) and a perceived neglect or lack of contact with extension workers ($\overline{X}$ = 4.75)

Table 4: Regression results of factors influencing farmers' use of improved technologies in cassava production

Explanatory Variables	**Beta Coefficient**	**t-values**
Intercept	3.882	14.41
Sex	0.118	0.765
Education	0.145*	6.236
Contact with extension agents	0.156*	5.770
Farm size	0.098	1.497
Statistics		
R^2	0.567	
SE	0.60	
Calculated F-value	37.18	

Table t value of 5%* = 2.132; 10% = 1.533

In order to determine the personal factors which influence farmers' use of improved technologies in cassava production, the level of use of the improved technologies was regressed on farmers' sex, level of formal education, contact with extension agents and farm size (Table 5). The value of coefficient of multiple determination (R^2 = 0.567) indicates that about 57% of the variation in the dependent variable (use of improved technologies) was explained by the variations in the explanatory variables (sex, levels of formal education, contact with extension agents and farm size). The coefficients of all the explanatory variables were positive but only education (b=0.145) and contact with extension agents (b=0.156) were significant at the 5 percent level.

An additional unit increase in education yields almost 15% increase in farmers' adoption of improved technologies while a unit increase in extension contact with farmers leads to an adoption increase of almost 16%. The result for extension input effect agrees with Floyd et al (1999) and Erie and Onemolease (2001), while the results for education effect on technology use supports the findings of Onemolease *et al* (2000). The significant role of education in adoption of agricultural innovations among farmers is because it enhances behavioural changes by improving understanding of complex materials and value and use of innovations. Although farm size showed no significant relationship, its coefficient was positive, suggesting a positive relationship between both variables. This is expected as it is more economical to invest new production technologies in big farms than small farms.

Conclusion

The average percentage level of awareness of most of the recommended technologies associated with cassava production was less than 50%. This implies that information on these technologies was not widely disseminated by the extension service or by contact farmers. The average percentage adoption level was much less (about 21%), indicating a very low level of extension effectiveness. The average number of technologies adopted by respondents was three out of eight representing 38% adoption rates, with the some of them described as low adopters (25%).

Neglect by extension agents and non -availability of improved cassava cuttings were considered by farmers as very serious constraints to their use of the improved technologies. About 57% of the variation in farmers use of cassava production technologies was explained by sex, level of formal education, contact with extension agents and farm size, while their use of the technologies was significantly related to their educational status and contact with extension workers.

Recommendations

Based on the findings of this study, the following recommendations are made towards enhancing the utilization of new technologies in cassava production in the study area.

(i) Edo State ADP should improve on their information dissemination methods so as to create better awareness of improved technologies in cassava production. In order to realize this, a combination of extension methods should be used to create awareness.

(ii) A major constraint to the use of improved technologies is the irregular extension visits as well as inadequate number of extension workers needed to perform farm advisory services. Efforts should be made on the part of the Edo ADP to encourage farmer-to-farmer extension to complement extension service efforts.

(iii) Neglect by extension agents and lack or inadequate improved cassava cuttings constituted a hindrance to farmers' use of improved technologies in the study area. Edo State ADP should put in place measures to eliminate these constraints. There should be a drive to produce and distribute improved cassava cuttings to farmers in the study area,

(iv) To eliminate or reduce the incidence of innovation discontinuance, extension workers concerned should not be limited to farmers' use of improved technologies but also should include monitoring their adoption practice.

References

Ajala, A.A (1992): Factors associated with adoption of improved practices by goat producers in South - Eastern Nigeria. Research Monograph No. ,r 5, Department of Agricultural Extension, University of Nigeria, Nsukka. Pp 1-6

Ekumankama, O.O. and Nwankwo, G. (2002): "Radio Farm Broadcasts: A study of adoption of agricultural innovations in

Umuahia zone, Abia State" Journal of Agricultural Extension Vol 6, pp 17-24

Erie, A. P. and Onemolelase, E.A. (2001): The relative performance of contact and non- contact maize farmers in Edo State ADPs programme for maize production The Nigerian Journal of Agriculture and Forestry. Vol 1, No. I, pp l37-145.

FAO (1996): The World Food Summit' Food and Agriculture Organization (FAO) Rome, Pp. 10.

Floyd. C.N., Harding, A.H. Paddle, K, C, Rasah, P.P. Subedi, R.D. and Subedi, P.P. (1999): The adoption and associated impact of technologies ip the Western Hills of Nepal, Odi Agricultural Research and Extension Network, Network Paper No. 90 Pp. 15.

Ogunsumi, L.O. Augustus, E.O. Ogbosuka, G.E. and Omoyajowo A.O. (2002); Impact of adoption of maize production technology on women farmers in Oyo State, Nigeria" in T.A. Olowu (ed) Stakeholders participation for strengthening Agricultural Extension Practice and'Food Security in Nigeria Proceedings of the 8th annual national conference of the Agricultural Extension Society of Nigeria (AESON) 16*-19th September.

Onemolease, E.A. and Aghanenu A.S. and Adisa T. (2001): Effect of formal school education of farmers output and adoption of innovations: A case study of rubber farmers in Ikpoba Old: local government area of Edo State Journal of Teacher Education and Teaching Vol. 5 No. 1 Ekpom Nigeria. Pp. 114-118.

Windapo, O. (2000): "Knowledge implementation accuracy of maize and cassava technology transfer in Oyo state agricultural Programme Ph.D. thesis in the Department of Agricultural Extension Service; Faculty of Agriculture and Fore! Resources. University of Ibadan Ibadan, 279p