faman Proceedings of the 24th Annual National Conference of Farm Management Association of Nigeria, 11th – 14 Oct, 2010

ADOPTION OF IMPROVED TECHNOLOGY AMONG SMALL SCALE CASSAVA FARMERS IN LAPAI LOCAL GOVERNMENT AREA, NIGER STATE. NIGERIA

E. S. YISA, J. H. TSADO AND C. A. UZUOMA
Department of Agricultural Economics & Extension Technology, Federal University of Technology- Minna. Nigeria

ABSTRACT

This study aimed at determined the rate of adoption of improved cassava technology among small scale farmers in Lapai Local Government Area of Niger State, Nigeria. Data were collected from 90 farmers by the use of well-structured questionnaire. Data collected were analyzed using simple descriptive statistics and Ordinary Least Square (OLS) regression analysis. Results showed that 91.1% of the sampled farmers were male, 95.6% married, 57.8% did not participate in co-operative association, all the farmers had access to the services of extension agents and were full time farmers and 92.2% were aware of improved technology. Results from the regression analysis shows that the three variables, years of farming experience, farm size and labour per man-day were all statistically significant at 5%, 1% and 5% respectively. The study concluded that non adoption of improved technology was due to the fact that farmers had no access to credit facilities, problems of managerial inefficiency of most of the capital intensive equipment and marketing problems. It is recommended that extension service providers in Nigeria should take into consideration the importance of these variables when promoting improved technologies to farmers.

Keywords: Cassava, Improved technology, Adoption, Small scale farmer.

INTRODUCTION

The agricultural sector in Nigeria comprises mainly of small scale farmers engaged in production but as the country advances technologically, with right policies and the use of vast natural resources, to a great extent, farmers in the country have been able to achieve some level of self sufficiency in food production. Currently cassava cultivation is an income generating activity. This enhanced status is as a result of increased demand for cassava and its products outside the rural communities (Ikpi *et.al.*, 2000) as well as the realization of the potentials it has in contributing to the attainment of self sufficiently in food production (Agboola, 2001)

The growth of cassava as a major economic and food security crop over the past few decades has generated significant research interest at both the national and international level. For instance, the International Institute of Tropical Agriculture (IITA) and National Root Crop Research Institute (NRCRI) developed and distributed respectively the Tropical Manihot Selection (TMS) 30555, 30572, 30211, 50395 and 60506 varieties in the early 1970s and 80s (IITA, 1990). These varieties are not only high yielding but are also resistance to pest and diseases such as cassava mosaic, bacteria blight and mealy bug. Considering the trend of demand for cassava cuttings, it's envisage that cassava farmers may have adopted these improved innovations and other technologies to strengthen their economic base.

Cassava is a source of food. Food is a source of energy and nutrient for human survival. Except man is adequately fed, development in general will become a mirage. The need for self sufficiency in food both in quantity and quality is a prime objective in agricultural development. Moreover Nigeria is regarded as one of the most populous countries in Africa engaged in export of cassava. But it is surprising that despite the demand for food, which could increase the national gross income, Nigeria still experiences gross insufficiency in food production. This is because emphasis has been shifted from the agricultural sector to the oil sector. Before the advent of "oil boom" in Nigeria, agriculture provided the largest source of income to the nation's Gross Domestic Product (GDP). This led to the complete abandonment of agriculture.

The broad objective of this study was to determine the rate of adoption of improve cassava technology by farmers in Lapai Local Government Area of Niger State, Nigeria. The specific objectives are to;

i. describe the socio-economic characteristics of small scale cassava farmers in the study area;
ii. examine the level of awareness of the new technologies by farmers
iii. Ascertain the level of adoption of the new technologies by the farmers
iv. Examine the factors affecting adoption of improved technologies by farmers ;
v. identify constraints encountered by farmers in the use of these improved technologies.

METHODOLOGY

The study area, Lapai Local Government Area of Niger State was created on 1st April, 1976. It lies between latitude 3°20′ north and 7°40′ north and longitudes 8° and 11°3′ east. The state lies in the guinea savannah vegetation belt of the country with favorable climatic condition for crops and livestock production. It is boarded to north by Sokoto State, west by Kebbi State, south by Kogi State, South-west by Kwara State, Kaduna State and Federal Capital Territory (FCT) boarders the state to the north-east and south-east respectively. The state has twenty five (25) Local Government Areas.

The study area was purposively chosen based on the long history and large quantity of cassava production amongst farmers in Lapai local government area. Three villages were randomly selected from the villages that the technologies were disseminated; these villages are Cece I, Nassarawa and Cece II and thirty (30) cassava farmers were randomly selected from each of the villages making a total of Ninety (90) respondents. A well structured questionnaire was administered to elicit information from the respondents.

Analytical Model

In the determination of adoption of improved cassava technologies, it was hypothesized that adoption is influenced by some farmer specific variables. Consequently the Ordinary Least Square multiple regression analysis was employed to analyze the data. The models were specified as follows:

1. Linear function

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + e_i$$

2. Cobb – Douglas (Double log)

$$\ln Y = b_0 + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X_7 + b_8 \ln X_8 + b_9 \ln X_9 + e_i$$

3. Exponential

$$\ln Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + e_i$$

4. Semi-log

$$Y = \ln b_0 + b_1 \ln X_1 b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X_7 + b_8 \ln X_8 + b_9 \ln X_9 + e_i$$

Where:

b_0 = Intercept/constant term

b_i = Co-efficients

e_i = Error term

Y = Adoption index proxied by the number of hectares devoted to improved technology of cassava.

Xi = Age of Respondent (years)

X_2 = Gender of respondent (binary variables; male- 1 female – 0)

X_3 = Marital status of respondent (separated, single, divorced = 0; married = 1)

X_4 = Educational level of respondent (measured in number of years spent in school)

X_5 = Membership of co-operative (binary variable in member =1; non member = 0)

X_6 = Years of farming experience (years)

X_7 = Contact with extension agent (measured in numbers)

X_8 = Number of household member (measured in numbers)

X_9 = Labour in Man-Days

RESULT AND DISCUSSION

Table1: Socio-Economic Characteristics of Respondents

Variable	Frequency	Percentage
Age range		
21-30	2	2.2
31-40	45	50.0
41-50	27	30.0
Above 50	16	17.8
Gender		
Male	82	91.1
Female	8	8.9
Marital status		
Single	4	4.4
Married	86	95.5
Educational level		
No formal education	46	51.1
Primary education	42	46.7
Secondary education	2	2.2
Size of household		
Small household	21	23.3
Large household	69	76.7
Years of farming experience		
0 – 5 years	3	3.3
6 – 15 years	9	10.0
16 – 25years	34	37.8
Above 25 years	44	48.9
Farm size (ha)		
0-1	2	2.2
1-2	18	20.0
3-4	61	67.8
Above 5	9	10
Participation in co-operative		
Yes	38	42.2
No	52	57.8
Contact with extension agent		
Yearly	4	4.4
Quarterly	7	7.8
Monthly	27	30.0
Weekly	52	57.0

Source: Field Survey, 2006

Table 1 revealed that 50% of the respondents are between the age ranges of (31-40) years. This shows that most of the respondents are still in their active and production age and so will tend to adopt improved technology. This is in conformity with study of Polson and Spencer, (2000) who found that young farmers have more knowledge about new practices and may be more willing to bear risk due to their planning horizons than older farmers. In contrast Musa, (2000) found no significant relationship between age of the farmer and adoption. Most of the respondents were male (91.1%), this show that more males are into cassava farming when compared with their female counterparts because farming is labour intensive and females are said to be the weaker sex. The analysisi also show that 95.6% of the respondents were married. This may be due to the fact the majority of them believed that getting married will help reduce the cost of hired labour as they can be assisted on the farm by their children.

Table 1 further reveals that more than half of the respondents (51.1%) have no formal education. This shows that most of them are illiterate and their rate of adoption of improved technologies will be slow. Clark and Akinbode (1981) found that among rice farmers, high adoption was significantly correlated with level of formal education. Also, 76.7% of the respondents have large household sizes comprising of more than six (6) members which means cheaper labour for the farmer. Akanya (2000), found number of children and number of wives positive and significantly associated with farmers adoption score. However household size was found to have a statistically significant association with adoption of new practice (Vol *et al* 2000).

Akinola (2002) observed that, years of experience in farming and the ability to read and write is expected to be related to ability of the farmers to obtain process and use information relevant to cultivation under rice ecology. Table1, equally shows that (48.9%) of the respondent are experienced cassava farmers as they have more than 25years of experience in farming and "experience is the best teacher" but 3.3% have less than 5years experience.

Farm size according to Akinola (2002) is positively and significantly associated with farmers, the Table shows that 67.86% of the respondents have 3-4 hectare of land which means that most of them are subsistence or small scale farmers though with a fairly large size of land. Furthermore the results show that 57.8% of the respondents had weekly contact with the extension agent. This means that most of the respondents have frequent contact with the extension agents, which implies that they had access to information about innovations and improved technologies regularly since they had personal contact with extension agents. Nweke, (2002) concluded that personal contact tends to be more important and effective means of exposure.

Table 2: Awareness of improved varieties

Awareness	Frequency	Percentage
Aware	83	92.2
Not aware	7	7.8
TOTAL	90	100.0

Source: Field survey, 2006

The extent of adoption of improved variety depends on the extent of awareness about the improved varieties by the farmers. Table 2 shows that almost all the respondent (92.2%) are aware of improved varieties of cassava. This means that most of the respondents know about the existence of improved cassava varieties.

REASONS FOR ADOPTION OF IMPROVED VARITIES

There are various reasons that can make farmer adopt new technologies especially improved varieties. Reasons for adoption are usually due to positive changes observed or achieved by farmers as a result of the improved varieties. The reasons are represented in Table 3 below.

TABLE 3: Reasons for adoption of improved varieties by the respondents

Reasons	Frequency	Percentage
Profitability	31	34.4
High yield	44	48.9
Early maturity	4	4.4
Bigger tubers	11	12.2
Total	90	100.0

Sources: Field Survey, 2006

Table 3 shows that almost half of the respondents (48.9%) adopted the improved varieties due to it high yield. That is the output is higher when improved varieties are planted than when local or non-improved varieties are used. 34.0% said that improved varieties are profitable, that is, they get higher returns from improved varieties. Jos and Hrishi (1996), reported that improved cassava varieties produces systematically higher root yield than local varieties event without fertilizer application.

LIMITATION FACED BY RESPONDENTS IN THE USE OF IMPROVED VARIETY

Limitation faced by farmers in the adoption of improved varieties has been given as major reason for low productivity among small scale farmers. Limitation to adoption of improved varieties is presented in table 4 below:

TABLE 4: Limitations to adoption of improved varieties by the respondents.

Limitations	Frequency	Percentage
Small farm size	22	9.95
Not aware of techniques	9	4.07
Poor communication channel	27	12.22
Lack of equipment (Tractor)	38	17.19
Inadequate fund	33	14.93
Marketing Problems	60	27.15
No co-operative farmers Association	32	14.48
Total	221	100.0

Sources: Field survey, 2006
Note: Multiple responses recorded.

Table 4 reveals that marketing of cassava tubers was a major problem, as a result of this majority of the farmers are producing lost. Lack of equipment and inadequate fund 17.9% and 14.93% respectively are the limitation that was also faced by the respondents in the adoption of improved varieties. This is as a result of the subsistence nature of the farmers and so they don't have adequate fund to either purchase the improved varieties are buy farm equipment which they can use to cultivate large hectares of land for commercial purpose.

FACTORS AFFECTING THE LEVEL OF ADOPTION OF IMPROVED CASSAVA TECHNOLOGY.

In determining this, the OLS (ordinary least square) multiple regression analysis was adopted where Y=the adoption index proxied by the number of hectare adopted to improved

technology of cassava was regressed against age of the respondent (X_1), gender of the respondent (X_2), marital status (X_3), Educational level (X_4), membership of co-operative (X_5), years of farming experience (X_6), construct with extension agent (X_7), number of household member (X_8), and labour per man day (X_9).

Four functional forms were tried and the exponential functional form was chosen as the lead equation based on the following:

1. R^2 value (coefficient of multiple determination) i.e. the explanatory power of the model.
2. Significance of estimated co-efficient.
3. Magnitude of estimated co-efficient.
4. Conforming of signs estimated with a priori expectation.

The result is presented in the Table below:

Table 5: Regression Estimate of Factors Affecting Level of Adoption of Improved Cassava Technology By Small Scale Farmers

VARIABLES	LINEAR	COBBS-DOUGLAS	SEMI-LOG	EXPONENTIA
Constants	0.374	-5.149	-5.333	-
0.760				
	(0.604)	(-1.396)	(-0.905)	(-1.944)
Age	-1.203e-02	-0.326	-0.523	-6.597E-(
	(-1.145)	(-1.094)	(-1.100)	(0.247)
Gender (X_2)	-0.169			
	(- 0.845)			(0.247.
Marital status (X_3)	-9.280E-02			
	(0.343)			(
Educational level (X_4)	6.578E-02	6.212E-02	9.026E-02	
	(1.917)	(0.798)	(0.726)	(
Membership of co-operative (X_5)	-0.112			
	(-1.001)			(
Years of farming Experience((X_6)	1.508E2	0.549	0.491	
	(1.341)***	(3.710)	0.048)	(2
Contact with Extension agents (X_7)	- 2.087 E-02	-1.297E-03	-2.0125E-02	-1.099E-(
	(0.799)	(0.032)	(-0.312)	
Number of Households (X_8)	-2.627E-02	-0.208	-0.448	
-8.244E-02				
	(-0.855)	(-0.349)	(0.641)	
(-0.425)				
Labour per man-day(X_9)	4.735E-04	0.699	1.080	
2.746E-04				
	(0.019)**	(1.107)	(1.072)	
(2.208)**				
R^2	0.483	0.789	0.634	
0.554				
R^2 Adjusted	0.417	0.730	0.532	
0.497				
F-Statistics	7.375	13.335	6.199	
0.810				

Sources: Computed from survey data, 2006. ** Significant at 5% (0.05 level of significance) Figures in parenthesis are t-ratios

*** Significant of 1% (0.001 level of significance)

The result in table 5 reveled that exponential functional form is used as the lead equation because it gives the "best fit". The models has R^2 value of 0.554 this implies that about 55.4% of the variation in number of hectares devoted to improved technology (Y) is explained by the variables included in the model. Thus, the remaining 44.46% is as a result of other factors that are non inclusive, the F ratio statistically significant at 1% level. Amongst the variables included in the model, only two were significant in explaining the adoption of improved cassava technology. These were years of farming experiences (X_6), and labour per man-day (X_9).

The co-efficient for years of farming experience (X_6) was 1.681E-02, which is positive and statistically significant at 5%, it implies that years of farming experience has a positive and significant relationship with the level of adoption. It also indicated that more experienced cassava farmers are more likely to adopt improved technology faster.

Also labour per man-day (X_9) was statistically significant at 5% which implies that labour per man-day has a positive and significant relationship with the level of adoption. It also indicated that farmers get to adopt improved technology to cover for the expenses spent on labour by them.

CONCLUSION AND RECOMMENDATIONS

The adoption of improved cassava technology by small scale farmers will go a long away to increase

the yield of cassava and also the profitability of production. Though most farmers are aware of the technologies and intend to adopt it, farmers refuse to adopt improved technologies not because they are ignorant but because they do not well understand the technology, some due to inadequate funds to acquire the technologies and marketing problem. Therefore, the adoption of improved cassava technology should not be under emphasized when discussing factors affecting adoption of improve technologies. It is recommended that improved varieties should be made readily available for farmers at affordable prices, extension agents should disseminate relevant information to farmers. Farmers should join co-operatives or form new ones in order to get assistance from government and other relevant institutions. Access to marketotlet where farmers can readily sell their products with reasonable price, to ensure continuous use of improved cassava technology.

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Economic Analysis of Small Ruminant Production in Bosso Local Government Area, Niger State, Nigeria.

Jirgi, A. J[1].; M. A. Ojo[1]; L. Tanko[1]; P. Atomode[1], E. S. Yisa[1] and D. J. Jirgi[2]

Deparment of Agricultural Economics and Extension Technology, Federal University of Technology, Minna, Niger State.

Department of Animal Science, Ahmadu Bello University, Zaria, Kaduna State.

E-mail: abijirgijohn@yahoo.com

ABSTRACT

The paper examined the economic analysis of small ruminant production in Bosso local Government Area of Niger State. Data were collected from a total of 90 respondents using purposive random sampling technique in 2007. Inferential statistics, farm budgeting and regression analysis were used in the analysis of the data. Result of the allocative efficiency index showed that feed cost, labour, other inputs and fixed cost were underutilized. Thus, farmers should increase the use of these resources efficiently in order to enhance profit. This can be achieved by obtaining loans from agricultural banks and by encouraging farmers in the study area to form cooperative.

INTRODUCTION

Livestock production represent a major nutritional investment with important economic, nutritional and social implication for the country (Ademosun, 1996). Nigeria as a developing country is faced with a worsening situation of inadequate protein consumption (Eliagu, 1991). In a nutritional profile in Nigeria,Owolabi, (1998) reported that the protein supply per capita 44.0g out of which animal products was less than 2.0%. this has led to protein deficiency which is responsible for under-nutrition and malnutrition which are wide spread at all ages and in Nigeria in general.

It is therefore necessary to increase the production of domestic animal protein. One of such domestic animals that are relatively easy to manage in small household is the small ruminant. Small ruminants are known to be prolific, have short generation intervals and above all their management is less capital intensive, therefore can easily be managed in small household. The small ruminants under consideration are sheep and goat. the largest concentration of these small ruminants are found in the sudan savannah zones. A high percentage (between 75% to 90%) of traditional households keep sheep and /or goat for various purposes such as meat production, income from sales and security against crop failure among other reasons. From the foregoing, it is important to study the economic analysis of small ruminants production in Bosso Local Government Area (LGA), Niger State in order to assess the type of management system, determine the costs and returns from sheep and goat product and the rource-use efficiency of the enterprises. The finding from this study will be useful in policy formulation towards achieving increased livestock production in the country.

METHODOLGY

The Study Area

The study was carried out in Bosso Local Government Area (LGA) of Niger State. The state is located between latitude 8^0 21N and 11^0 30N and longitude 3^0 30E and 7^0 20E. Bosso LGA is geographically located in the central part of the State. Agriculture is the major occupation with about 80% of the population engaged in farming. The major crops produced in the area include; rice, guinea corn, yam and millet while groundnut, maize cowpea, cassava and sugarcane are produced as minor crops. Livestock farming is also practiced, with sheep, goats, cattle and poultry mostly on free range.

Sampling and Data Collection

The purposive sampling method was employed to select the respondents. 50 sheep farmers and 40 goat farmers were selected making a total of 90 respondent. The main instrument for data collection was structured questionnaire. Data were collected on socio-economic characteristics o the respondents, type of housing, system of management, input and output prices etc.