

The Adoption Impact of Improved Cassava Varieties on the Social Life of Rural Farmers in Oriire Local Government Area of Oyo State

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Abstract

The study examined the adoption impact of improved cassava varieties on the social life of farmers in Oriire Local Government area of Oyo State. Using a well structured interview schedule to collect information, eighty (80) cassava farmers were sampled for the study. Specifically, the study identified the socio-economic characteristics of the farmers and determined the level of adoption of cassava varieties. Also the study determined the specific benefits derived from the varieties in use and finally investigated the constraints encountered by farmers in production of the improved varieties. The findings of the study revealed that 72.5% of the cassava farmers were male, 88.8% of them were married and 51.2% of them were Christians. The mean age of the respondents was calculated to be 46.7 and most of them earned between 26000 and 35000 as their monthly income. 37.6% had between 21 and 30 years farming experience. The results of the findings also revealed that 64.5% of the respondents had between 6 and 10 members in their household and 62.7% of the respondent produce between 1 and 5 tones of cassava in a production year. From the findings of the study also, all the respondents were using TMS 30572 and 92.5% of them agreed that high yield was the major feature that attracted them to adopt the variety. Pearson Product Moment Correlation analysis revealed that a significant and positive relationship exist between age, level of education and the adoption impact. Also a significant difference was found in the material life style and production level of the farmers before and after the adoption of improved varieties in cassava production. Poor access to credit was ranked as the most serious constraint to cassava production. Therefore the study recommends that credit facilities should be made available to registered cassava farmers by the Government so as to further boost cassava production, and loans disbursed should be properly monitored by relevant bodies.

Introduction

Cassava is the most grown crop in the southern part of Nigeria especially by the smallholder farmers. It plays a vital role in the food security of the rural economy because of its capacity to yield under marginal soil conditions and its tolerance of drought. Both rural and urban communities use cassava mainly as food in both fresh and processed form (IITA, 2004). Cassava based meal are the most frequently eaten meals in the rural areas in Nigeria. Data from the collaborative study of cassava in Africa (COSCA) showed that 80% of Nigerians in the rural areas eat cassava meal at least once week (Nweke, et al 2002). Cassava production is currently put at about 33.8/million tons a year (FAO 2002). Total area harvested of crop in 2001 was 3.1million hectare with an average yield of about 1t/ha. In order to boost the yield which affects the level of production in cassava, the use of improved varieties in cassava production arose which led to the use of improved breed. Nweke et al (2002) maintained that cassava performs five main roles; famine reserve crop, rural food staple, cash crop for urban consumption, industrial raw materials and foreign exchange earner. Nweke et al (2002) also maintained that Nigeria is the most advanced of the African countries poised to diversify the use of cassava on a primary industrial raw material and livestock feed. Two factors provide Nigeria with this comparative advantage in Africa; The rapid adoption of improved cassava varieties and the development of small-scale processing technologies.

It had been suggested that before modern research on cassava started in Nigeria in 1954 at the FDAR, Ibadan, there were numerous local ecotypes of traditional clones. These varied in their tuber yields and general tolerance of prevailing pests and diseases. "Oloronto" (53101), a local cultivar from the Ibadan/Abeokuta area, was then recommended for southern Nigeria. It was later used in 1967 which led to the release of improved varieties such as 60444, 60447 and 60506 for the whole country. In 1972 when cassava bacterial blight (CBB) became a scourge for cassava in the country, only 60306 and a few local types tolerated the disease breeding. IITA later identified improved clones which were released after 1976.

Release of the first two IITA clones, namely TMS 30211 and TMS 30395, were rapidly followed by TMS 30572, TMS 30001, TMS 30017, TMS 30337, TMS 30555, TMS 4(2)1425 and others (IITA 1984). These improved varieties differed in their resistance to cassava diseases and pests such as CBB, cassava mosaic virus (CMV), cassava anthracnose disease (CAD), cassava mealy bug (CMB) and cassava green spider mite (CGM). They also produced tubers with varying quality of roots at differing maturity duration and storage in the ground. These improved varieties always gave high yield (Hahn 1987, Herren and Bennett 1984,)

Farmers preferred improved varieties because of the higher yields, early maturity, high suppression of weeds and greater resistance to diverse diseases and pests (Akoroda et al, 1987, Ikpi et al 1986). A wide variety of cassava cultivars can now be observed in farmers' field but one or two cultivars may occur more frequently in a given zone. The most commonly observed local cultivars in southern Nigeria are;

“Odongbo” with a reddish petiole, cream –colour stem, moderate branching and clear white flesh.

“Oyoruda dudu” with indeterminate growth habit, dark stem and cream-coloured petiole

“Eye dudu” which is very similar to TMS 30572 and whose origin is suspected to be from IITA's stock dispersed by some extension staff in the early 1970's.

“Isunikaniyan” a high-branching, erect cassava variety with reddish petiole stem and peridem, usually early-maturing, mealy and sweet.

At each level of cassava production from the cultivation stage, harvesting, and processing particular technology is adopted to facilitate the production of cassava. At the clearing stage, tractor is used to do the clearing and the making of ridges. In other to disallow the growth of weeds that has the potential of impeding the growth of the crop, herbicides are sprayed on the cultivated land which will disallow the growth of weeds. Furthermore there are machines used in washing after harvesting; grating, pressing and frying. Technology has led to the processing of cassava into different form of eatable forms like chips and cake. It has also birthed its usage as an animal feed. Freshly harvested cassava roots are bulky and the shelf life rarely exceeds two days after harvesting due to enzymatic reactions. Cassava contains varying amounts of cyanogenic glucosides which break down to enzymatic reactions. Cassava also contains varying amounts of cyanogenic glucosides which break down to hydrocyanic acid, a toxic compound. The bulkiness and high perishability of harvested roots and the presence of cyanogenic glucosides call for immediate processing of the storage roots.

Simple processing- pounding, grating or chipping is essential for detoxifying the tuberous, highly perishable cassava roots into dry, stable, and safer products. Processing also adds value to cassava and extends the shelf life by converting freshly harvested roots into a freely traded commodity. Prior to the availability of improved technology in cassava production, the methods used are highly labour intensive. For example manual processing requires a minimum of four persons in a day to peel and wash, and twenty three persons/day to chip one tone of fresh cassava roots which translates to approximately US \$65/t of flour (Kormawa and Akoroda 2003 in preparation). The advent of improved technology machines like dryers, peeling machine and pelletizers makes the work easier. Improved storage and packaging techniques also extend shelf life and contributes to increasing cassava root availability and reliability, stabilizing prices and facilitating export.

The goal of agricultural research centers such as the International Institute of Tropical Agriculture (IITA) is to generate technology for improving productivity, farmer's welfare and household nutritional status. In recent years, there has been growing concern to assess the impact of agricultural research at farmers' level to determine who benefits from technological change and in what specific ways at both small-scale and societal levels. Yet, the majority of studies on the impact of agricultural research have been carried out within conventional economic frame-works such as benefit-cost analysis, economic surplus models, and economic efficiency estimation (Norton and Davis 1981; Jahnke et al.1987; Adesina and Zinnah 1992; Alston et al. 1995). Within such economic frameworks, little or no attention is given to the actual social impact of technology, that is, the impact of technology on the lives of people, their welfare, their nutritional status, their gender relations, and other social processes in the community. Impact on the lives of resource-poor farmers is probably the most functional benefit of agricultural technologies, and the dominant preoccupation of stakeholder (Jahnke et al, 1987; Collinson and Tollens 1994). There is thus a strong need to focus on the adoption impact of agricultural technologies in sub-saharan Africa where social concerns are higher and more pressing than anywhere else in the world (Demery et al. 1993).

As an instrument of user-oriented and people –centered research, the social impact assessment (SIA) framework has been developed using a more holistic and comprehensive approach in response to the limitation of the traditional economic impact analysis. SIA represents an effort to analyze the real, or potential, impact of technologies upon specific groups of people. It requires analysis of changes that occur in the lives of people as a result of adopting innovations or new policy interventions. It helps to determine how far a technology has been successful in meeting social and economic objectives, and how well such technologies satisfy the needs and aspirations of households or other larger social units in the target population (Campbell 1990; Cernea 1991).

SIA findings can also help to improve the efficiency of the spectrum of technology development, its targeting and its transfer in order to amplify the benefits accessible to a greater number of people, and presumably to prevent, or at least mitigate potential adverse consequence. As most impact studies of agricultural technologies use economic models, with little direct attention being paid to the actual impact on the lives of resource-poor farmers, the study identified the socio- economic characteristics of the farmers, determined the improved cassava technologies available to farmers and determined the level of adoption of the technology. The study also identified the specific benefits derived from the technology in use and finally investigated the constraints encountered by farmers in cassava production. The study further determined the relationship between the socio economic characteristic of farmers and the adoption impact of improved variety on the farmers' social life, the difference in the production level of cassava before and after the use of improved varieties and the difference in the material lifestyle of the farmers with the use of improved cassava varieties.

Methodology

Study Area

This study was carried out in Oriire Local Government Area of Oyo-State. The study area is situated within the tropical rainforest region and agriculture is the predominant occupation in the study area. The climate in the study area is of tropical type with two distinct rainfall patterns, the rainy season which marks the agricultural production season is between the months of April and October. The heaviest rainfall is recorded between the month of June and August while driest month are November to March. The average total annual rainfall ranges between 1000mm and 1500mm with high daily temperature ranging between 28^oc and 30^oc (FAOSTAT, 2004). Agriculture is the main occupation of the people and the major food crops in the study area include maize, rice, yam, cassava and cocoyam while the major cash crops grown are; cocoa, kola nut and oil palm. The sample was drawn from four (4) major villages in Oriire Local Government Area of Oyo-State because of the concentration of cassava farmers. Multistage sampling technique was employed for the study.

The first stage is a purposive selection of four (4) major villages in the Local Government Area. The second stage was a random selection of twenty (20) cassava farmer households per village. A total of eighty (80) respondents were selected through the use of interview schedule. Data for the study was collected with the aid of a well structured interview schedule and information collected were based on the stated objectives of the study. The analytical techniques that was employed in this study include; the descriptive statistic which was used to discuss the objectives, while socio impact assessment scale was used to determine the impact of improved varieties on farmers social life and Pearson product moment correlation was used to determine the relationship between the socio-economic characteristics and adoption impact of improved technology in cassava production on the social life of farmers. The variables that were measured are categorized into two; the dependent and the independent variables.

The dependent variable of the study is the adoption impact of improved varieties on the social life of rural farmers and the impact was measured by using social impact assessment items such as;

1. Material style of life.
2. Level of production.

The following are the independent variables measured;

The independent variables are the socio-economic characteristics of the farmers and they include their Age, yield, Sex, religion, marital status, level of income, year of farming experience, level of education, system of land acquisition and farm size.

Data Analysis and Discussion of Results

Socio-Economic Characteristics of Respondents

The findings in table 1 show that 72.5% of the cassava farmers were male, while 27.5% of the cassava farmers were female. 88.8% of the respondents were married while 11.2% were single. 51.2% of the respondents were Christians while 48.8% were Muslims. This implies that most of the farmers were Christians. The mean age was calculated to be 46.7.

Table1: Distribution of Socio-Economic Characteristics of the Respondents

Sex	Frequency	Percentage
Male	58	72.5
Female	22	27.5
Marital status		
Married	71	88.8
Single	9	11.2
Religion		
Christian	41	51.2
Islam	39	48.8
Age		
≤30	14	17.8
31-40	25	30.5
41-50	25	31.6
51-60	13	16.4
>60	3	3.9
Level of income		
15,000-24,000	31	38.3
26,000-35,000	41	50.4
36,000-45,000	7	10
>50,000	1	1.3
Farming experience		
≤ 10	17	21.5
11-20	24	30
21-30	30	37.6
31-40	6	7.1
41-50	3	3.8
Level of education		
Non formal education	16	20
Adult education	1	1.2
Primary school uncompleted	6	7.5
Primary school completed	11	13.8
Secondary school uncompleted	8	10
Secondary school completed	32	40
Tertiary	6	7.5
System of land acquisition		
Inheritance	73	91.1
Borrowed	5	6.3
Purchased	1	1.3
Leased	1	1.3
Household size		
1-5	11	26.7
6-10	62	64.5
11-15	5	6.3
16-20	2	2.5
Yield		
1-5	50	62.7
6-10	30	37.3
≤ 5	3	3.8
6-10	22	27.6
11-13	21	26.3
16-20	25	31.4
21-25	6	7.5
26-30	3	3.4
Total	80	100

Source: Field Survey, 2012

This implies that most of the farmers were in their active age and the respondents were expected to have a vast knowledge in cassava farming monthly income. Majority (50.4%) of the respondent earn between 26,000 and 35,000. 37.6% had between 21 and 30 years of farming experience in cassava production and 40% of the respondents completed their secondary school education. 20% of the respondents had no formal education and 38.8% completed their primary education.

Another 10% of the respondents did not complete their primary education, 7.5% had uncompleted primary education and tertiary education respectively and 1.2% had adult education. From the findings, it can be inferred that the level of education in the study area is relatively high which might have influenced the adoption rate of improved cassava varieties. 91.1% of the respondents acquire their land by inheritance, 6.3% of them by borrowing, and 1.3% by purchasing and leasing. Owing to the fact that majority of the respondents inherited their land; the money that would have been incurred on acquisition of land will be expended on the acquisition of improved varieties which in-turn might have boosted cassava production. Majority (64.5%) had between 6 and 10 members in their household and majority 62.7% of the respondents also produce between 1 and 5 tones of cassava in a production year. This implies that high yield with the use of improved varieties will increase the farmers level of income thereby improving their purchasing power for a better living.

Improved Varieties

The table 2a below shows that all the respondents make use of TMS 30672. This implies that the most prominent variety in use is the Tms 30672

Table 2a: Distribution of respondent by name of improved varieties

Varieties	Frequency	Percentage
Tms 30672	80	100
Tms 30211	0	0
Tms 30001	0	0
Tms 30017	0	0
Tms 30337	0	0
Tms 30555	0	0
Total	80	100

Source: Field Survey, 2012

Features of Improved Varieties

Table 2b indicates that 92.5% of the respondents agreed that high yield was the major feature that attracted them to the adoption of Tms 30672 varieties while the others (7.5%) agreed that it is the long size of the tuber.

Table 2b: Distribution of respondent by feature of improved varieties

Features	Frequency	Percentage
High yield	74	92.5
Long tuber	6	7.5
Total	80	100

Source: Field Survey, 2012

Level of Adoption of the Improved Varieties of the Respondents

The adoption level on table 3 was measured using a four (4) point scale; still in use all the time, still in use most of the time, still in use not all the time and used and discontinued. All the farmers agreed that TMS 30572 is the variety that is mostly used by the respondents.

Table 3: Distribution of respondents by adoption level

Varieties	Still in use all the time	Still in use most of the time	Still in use not all the time	Use and discontinue
TMS 30211	0(0)	0(0)	0(0)	0(0)
TMS 30395	0(0)	0(0)	0(0)	0(0)
TMS 30572	0(0)	80(100)	0(0)	0(0)
TMS 30001	0(0)	0(0)	0(0)	0(0)
TMS 30017	0(0)	0(0)	0(0)	0(0)
TMS 30337	0(0)	0(0)	0(0)	0(0)
TMS 30555	0(0)	0(0)	0(0)	0(0)

Source: Field Survey, 2012

Benefit Derived

Table 4 below shows that all the respondents agreed that high yield and increase in market value were the major benefits derived, 98.8% agreed that it was early maturity and 93.8% agreed that it was high suppression of weed while to 96.3%, it was greater resistance to diverse disease and pest. This implies that all the respondents agreed that high yield and increase in market value were the major benefits derived.

Table 4: Distribution of respondent by benefit derived

Benefit	Frequency	Percentage
High yield	80	100
Early maturity	79	98.8
High suppression of weeds	75	93.8
Greater resistance	77	96.3
Increase market value	80	100

*Multiple Response. Source: Field Survey, 2012

Constraints

Table 5 below shows the different categories of constraints experienced by farmers in cassava production. The constraints were categorized into serious, mild and not a constraint and later ranked. Poor access to credit facilities was ranked first with a weighted mean score of 1.99 which is a serious constraint; inadequate capital was also a serious constraint with a weighted mean score of (1.79) and poor market channel (1.13) when ranked. This implies that majority of the respondent agreed that poor access to credit was a major constraint to cassava production in the study area.

Table 5: Distribution of respondents by constraints to cassava production

Constraints	Serious constraints	Mild constraints	Nota constraints	Mean score	Weighted score	Rank
Poor access to credit facilities	79(98.8)	1(1.2)	0(0)	159	1.99	1
Inadequate capital	63(78.8)	17(21.2)	0(0)	143	1.79	2
Poor storage facility	17(21.2)	39(48.8)	24(30)	73	0.91	4
Poor road network	16(20)	29(36.2)	35(43.8)	61	0.76	5
Lack of readymade market for produce	3(3.8)	32(40)	45(56.2)	38	0.48	9
Unavailability of improved technology	5(6.3)	38(47.5)	37(46.2)	48	0.6	6
Lack of technology know how	2(2.5)	42(52.5)	36(45)	46	0.57	7
Low level of education	3(3.8)	29(36.2)	48(60)	35	0.44	10
Fear of the future	2(2.4)	31(38.8)	47(58.8)	35	0.44	10
Natural occurrence	4(5)	36(45)	40(50)	44	0.55	8
Poor market channels	3(3.8)	30(37.4)	47(58.8)	90	1.13	3

*Multiple Responses. Source: Field Survey, 2012

Adoption Impact of Improved Varieties

Table 5 below shows the impact of improved varieties of cassava on the respondents' social life. The result of the findings in this table indicates that there was an improvement in the housing condition of the cassava farmers as most (71.3%) of them were able to afford better housing materials. Also an improvement was found in their health condition as most of them (66.3%) were able to afford modern health care. An improvement was also recorded in the respondents' mobility status as most of them (57.4%) and (37.3%) were able to afford better mobility status. Furthermore, an improvement was also recorded in the areas of water consumption (Borehole 65%), communication (television 41%, cell phone 38.8%), toilet facilities (water closet 35%, latrine 63.8%). This implies that the use of improved varieties had impacted positively on the social life of the farmers.

Table 5: Distribution of respondents by adoption impact of improved varieties

Variable	Before	After
HOUSING		
Thatched roof with mud wall	80(100)	1(1.3)
Thatched roof with cemented wall	0(0)	22(27.5)
Zinc roof with brick and cemented walls	0(0)	57(71.3)
HEALTH CARE		
Self medication	80(100)	2(2.5)
Spiritual/orthodox	0(0)	25(31.3)
Hospital/health care	0(0)	53(66.3)
MOBILITY		
None	1(1.3)	9(11.3)
Motorcycle/bicycle	79(98.7)	46(57.4)
Motorcar	0(0)	25(31.3)
ACCESS TO WATER		
Spring	80(100)	0(0)
Well	0(0)	28(35)
Borehole	0(0)	52(65)
CONSUMPTION OF WATER		
Spring	80(100)	2(2.5)
Well	0(0)	28(35)
Borehole	0(0)	50(62.5)
COMMUNICATION		
Radio	1(1.3)	8(10.1)
Television	79(98.7)	41(51.1)
Cell phone	0(0)	31(38.8)
DOMESTIC EQUIPMENT		
Gas stove	0(0)	11(13.8)
Washing machine	0(0)	5(6.3)
Refrigerator	13(16.3)	13(16.3)
Fan	67(83.8)	51(63.8)
TOILET FACILITIES		
Latrine	80(100)	51(63.8)
Water closet	0(0)	28(35)
Shower	0(0)	1(1.3)
Water heater	0(0)	0(0)

*Multiple Responses

Source: Field Survey, 2012

Hypothesis Tests

Analysis on Adoption Impact of Improved Cassava Varieties on the Social Life of Rural Farmers

Ho1: There is no significant relationship between the socio economic characteristic of farmers and the impact of improved variety on their social life.

Table 13 shows a significant and negative relationship between Age and adoption impact of improved varieties at 5% of significance. While a significant but positive relationship was found between level of education and adoption impact of improved varieties at 10% level of significance. This implies that the older the cassava farmers, the lower the impact of the use of improved varieties on their social life and the higher the level of education the more the impact. The might be due to the fact that as the farmers get older their strength for cassava production decreases therefore reducing their economic power to afford basic social amenities. The higher educational level influences the adoption of innovations which might have also occurred in cassava production as supported by some empirical studies.

Table 6: Relationship between socio economic characteristics and adoption impact

Variables	r-value	Significance
Marital status	-0.51	NS
Age	-.232	S
Level of income	-0.002	NS
Year of farming experience	0.024	NS
Level of education	0.297	S
House hold size	-0.161	NS

Ho2: There is no significant difference in the material lifestyle of the farmers before and the use of improved cassava varieties.

A significant difference was found in the respondents’ material lifestyle before and after the use of improved varieties. Table 7 is a proxy table for other impact variables as a significant difference was found to exist in the social life of the respondents after the use of the improved varieties which implies that the use of improved varieties had impacted positively on their social life.

Table 7: Distribution of respondents by difference in material lifestyle

	Paired Differences					T	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair1 HB-HA	-1.700	.488	.055	-1.809	-1.591	-31.169	7	.000
Pair2 HCB-HCA	-1.638	.534	.060	-1.758	-1.519	-27.452	79	.000
Pair3 MB-MA	-1.200	.624	.070	-1.339	-1.061	-17.190	79	.000

HB: Housing before, HA: Housing after

HCB: Health care before, HCA: Health care after

MB: Mobility before, MA: Mobility after

Ho3: There is no significant difference in the production level of cassava farmers before and after the use of improved varieties.

Table 8: Distribution of respondents by difference in production level

	T	d.f	Significance (2tailed)
Before and After	20.758	79	0.000

Conclusion and Recommendation

This study investigated the impact of improved cassava varieties on the social life of rural farmers in Orire Local Government Area of Oyo State. A total of 80 respondents were randomly selected and interview schedule was used to collect data. The population for the study comprises of cassava farmers in Orire Local Government Area. The study specifically identified the socio economic characteristics of the farmers, determined the improved cassava technologies available to farmers, determined the level of adoption of the technology, identified the benefits derived from the technology in use and finally investigated the constraints to the accessibility of the improved technologies. From the findings of the study, it was concluded that the adoption of improved cassava varieties had impacted positively on the social life of the cassava farmers.

A significant relationship was found between selected Age, Level of education and adoption impact of improved cassava varieties while poor access to credit was the major constraints faced by the farmers in the study area. The study therefore recommends that credit facilities should be made available to registered cassava farmers by the Government so as to further boost cassava production, and loans disbursed should be properly monitored by relevant bodies. Also, provision of farm inputs should be done at a subsidized rate to help boost their level of production.

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