International Journal of Agricultural Science, Research and Technology in Extension and Education Systems (IJASRT in EESs)
Available online on: www.ijasrt.webs.com
ISSN: 2251-7588 Print
ISSN: 2251-7596 Online
2014: 4(4):205-210

Received: 12 July 2014
Reviewed: 21 November 2014
Revised: 27 November 2014
Accepted: 19 December 2014

Factors Influencing Adoption of Improved Cassava Processing Technologies by Rural Women in Enugu State, Nigeria

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Abstract

The study examined factors influencing the adoption of improved cassava processing technologies. Interview schedule was used to collect information from 100 rural women involved in cassava processing. The average age of the respondents was 51 years and majority (77%) had formal education. The women's main source of information on the improved cassava processing technologies was through the WIA (extension) agents. Years spent on formal education, household size and credit accessibility had significant and positive influence on adoption of the improved technologies. Age had a significant but negative influence while membership of social organization and number of extension contact had no significant influence on the adoption. The WIA (extension) agents should intensity their contact with the women. The women should be engaged in more training programmes to learn more about the improved cassava processing technologies in order to improve their livelihood.

Keywords: Cassava Processing Technologies, Rural Women, Nigeria

1. Introduction

Cassava (*Manihot esculenta*) is a woody shrub of the euphorbiaceae family (Philips, 1983). It is extensively cultivated as an annual crop in tropical and sub-tropical regions for its edible starchy tuber roots. According to Linley *et al*., (2002), cassava is the third largest source of carbohydrates for meal in the world. Its high resilience and adaptability to a wide range of ecological conditions has sustained its production through many generations in sub-Saharan African (Adebayo, 2006).

Cassava was introduced in Nigeria by the returnee slaves from America (Nwibo *et al.*, 2011). It has performed so well in the country that Nigeria has become the world largest producer of cassava (FAO, 2006). Several initiatives have been launched to improve the cassava subsector and this has yielded great results (FAO, 2008). The government of Nigeria in 2002 inaugurated Presidential initiative on cassava, targeted at exporting five billion dollars worth of products from cassava based commodities. The desire of the government was to create a strong diversified economy with emphasis on non oil exports. Cassava is an important raw material for starch, ethanol and flour, but in Nigeria, the agro-industrial cassava market is an emerging one. The transformation of cassava into various forms has the potential to help Nigeria improve its manufacturing bases, generate income and employment. Presently, the Federal government of Nigeria, in line with her Agricultural Transformation Agenda, has recognized the need for additional ten percent of cassava flour to wheat flour for production of bread and other confectioneries to boost value chain in cassava production (Abali, *et al*., 2014).

The crop plays a dominant role in the food security of rural households because of its capacity to yield under marginal soil conditions and its tolerance to drought (Ezedinma *et al*., 2006). About 85% of cassava produced in Nigeria is consumed for industrial purposes in the proportions of 10% as chips in animal feed, 5% as syrup concentrate for soft drink while 1% is processed into high quality cassava flour used in biscuits and confectionaries, dextrin starch for adhesive, starch for pharmaceuticals, and seasonings (Kormawa and Akoroda, 2003).

The high perishability of harvested cassava root and the presence of cyanide in cassava require immediate processing of the roots. Besides, the continued increase in cassava output has raised the need for recommended cassava production and processing practices the increase in produce and high

quality products suitable for industrial use and export. Nwokoro and Aletor (2007) started that the traditional method of processing is dominant in Nigeria. Traditional processing is mostly done by women and it is considered to be inappropriate for women because it is labour intensive and cost effective (Odebode, 2003). It is also strenuous and associated with low productivity. Food and Agricultural Organization (2008) noted that Nigeria was the smallest exporter of cassava, through, the largest producer. This was attributed to many people not having the knowledge on how to process cassava for export (FAO, 2008). Against this backdrop, the cassava Enterprises Development Project (CEDP), a public private partnership (PPP) programme was jointly sponsored, by USAID and Shell Petroleum Development Company to promote cassava processing technology in the south-south and south-east of Nigeria since June 2000, with the International Institute of Tropical Agriculture (IITA) as the implementing partner for the programme. The programme developed processes for converting fresh cassava roots into high quality cassava flours (HQCF), chips, pellet and starch. HQCF was also used to make cassava based snacks like chin-chin, cake, buns, fish pie and doughnut. These improved cassava- processing technologies were disseminated to women groups in rural areas through Women-In-Agriculture (WIA) programmes in state agricultural development programmes (ADPs).

There has been wide adoption of some of these technologies in south east Nigeria. This study, therefore, determined factors that influenced their adoption. Specifically, the study:

1. Determined the socio-economic characteristics of the women processors,
2. Identified their sources of information on the improved cassava processing technologies and
3. Determined factors that influenced the adoption of the technologies.

2. Materials and Methods

The study was carried out in Enugu State, Nigeria. Enugu State is located in the savannah belt of Nigeria, with an average annual rainfall ranging from 1,6000 mm to 2,000 mm. Enugu State is one of the main cassava producing States in Nigeria with over 2 million metric tonnes (NPAFs, 2010). The cultivated area of cassava in the State was 238.5 million hectares in 2007, 250.4 million hectares in 2008 and 262.9 million hectares in 2009 (NPAFS, 2010). The population of the study consisted of all rural women who are beneficiaries of WIA programme in Enugu State. Out of the three senatorial zones that make up the State, Enugu- North Zone was purposively selected for the study. The people are traditionally and predominantly cassava farmers. Farming constitutes their major activity (Omeje and Ajayi, 2008). Ten communities involved in the activities of WIA programme were selected. In each community, two women groups were randomly selected, giving a total of 20 women groups. Five (5) women were then randomly selected from each women group to yield a total number of 100 respondents for the study. An interview schedule was used to collect information from the 100 rural women. The instrument included questions on their socio-economic characteristics and sources of information on the improve cassava processing technologies. The women also indicated the technologies, they have adopted. Data were analyzed using descriptive statistics (percentage and means) and multiple regression analysis.

3. Results and discussion

3.1 Socio-economic characteristics

Age

Majority (40%) of the respondents were within the age range of 40-49 years. The mean age was 51years. This shows that most of the women were still in their active years. This is an advantage for increased investment and improved technology utilization and hence innovativeness. Ani (2007) asserted that innovators are always in their middle age.

Level of education

Data in Table 1 reveal that a greater proportion (34%) of the respondents had primary education. Entries in Table 1 also show that 22% of the respondents had secondary education while 23% had no formal education. The remaining (21%) had tertiary education. It could be inferred that majority (77%) of the respondents were literate and this is an advantage for adoption of innovations in the study area. This will also facilitate dissemination of appropriate agricultural technologies to the farming population. It will likely make them more responsive to many agricultural extension programmes and policies. Abudu *et al*, (2014) reported that increase in education of farmers positively influenced adoption of improved practices.

Household size

Table 1 indicates that majority (58%) of the respondents had between 5-8 household members. The mean household number was 7. The implication of this finding is that more family labour would be readily available since relatively large household size is an obvious advantage in terms of farm labour supply.

Primary occupation

It is evident from Table 1 that greater proportions (38%) of the respondents were civil

servants. Some of them took farming as their primary occupation while 30% were engaged in trading and other business like tailoring, hair dressing (Table 1). This implies that majority of them were wage earners. Such income will help the women to raise capital for the improved cassava processing activities.

Membership of social organization

Majority (53%) of the respondents belonged to one organization while 37% belonged to 2-3 organizations (Table 1). Entries in table 1 also show that 10% of the respondents belonged to 4-5 organizations. The mean number of organizations they belonged to was 1.6. These organizations could serve as channels for extension contact with large number of farmers or other processors. They offer opportunities for participatory interaction with extension organizations (Agwu, 2004).

Extension visit in 2013

Entries in Table 1 show that a proportion (36%) of the respondents had between 0-2 contacts with WIA agents in 2012. It is also evident from the table that 29% had three to five contacts while 19% had 6-8 contacts, only 16% had between 9-11 contacts with WIA agents in 2013. From the fore going, it can be concluded that since the average number of visits was about 5 times in 2013, the respondents were not receiving as much extension support as necessary. This does not augur well for technology adoption. The WIA agents should take their work more seriously to improve the effectiveness of extension delivery among the women processors.

Access to credit facilities

Majority (79%) of the respondents had access to credit facilities while 21% had no access to credit (Table 1). It can be inferred that since a good number (38%) of them are wage earners, they can have access to credit. They can also belong to thrift societies or other societies where they can obtain credit by revolving loan among themselves. Access to credit enables processors to exploit full potentials for increased production.

Source of credit

A greater proportion (39%) of the respondents indicated that they source their credit from co-operative societies (Table 2). Table 1 also shows that a good number (37%) of them source their credit from thrift society. Some (24%) of them got from financial institutions like banks. That majority of the respondents' source their credit from co-operative societies is not surprising due to low interest rates associated with obtaining loan from co-operative societies. Credit from financial institutions is associated with high interest rate and provision of collateral which most of the respondents may not afford.

Sources of information on improved cassava processing technologies

Data in Table 2 indicate that majority (92%) of the respondents received information on the improved cassava processing technologies from WIA agents. Other sources of information were radio (15%), television (20%); friends/neighbors/relations (32%); fellow processor (45%) and meetings (20%). It is also evident from Table 2 that only 3% of the respondents obtained information from the internet. The fact that internet ranked the least source of information could be due to lack of knowledge on the use of internet. Besides, the women live in rural areas where there are no internet services and no electricity. The findings show that WIA agents play a major role in informing the women about improved cassava processing technologies. The findings confirm the dominant importance of extension agents as primary sources of information for farmers on new technologies (Adedoyin and Adebayo, 2005). The reliance of a majority of the respondents on WIA agents as a source of information on improved cassava processing technologies implies the need for the provision of adequate incentives for extension workers. This will help the WIA agents to attain the highest level of performance in serving these women involved in processing of cassava.

3.2 Influence of farmers' socio-economic characteristics on adoption of improved cassava processing technologies

Data in Table 3 show that age and years spent on formal education had significant influence on adoption of improved cassava technologies. Other variables that were found to have significant influence include household size, primary occupation credit availability. Membership of social organization and extension contact had no significant influence on adoption of improved cassava technologies (Table3). That age has an influence on adoption in this study is not surprising because previous studies by Ozor and Madukwe (2005) and Adeolu (2005) reported a significant relationship between age and adoption of new technologies. Age, in this study, had a significant and negative influence on adoption. This implies that younger women adopt the technologies more than the older ones. Obeta and Nwagbo (1990) noted that young farmers tend to be more flexible in their decision to adopt new ideas. However, Agwu (2004) reported that age had no significant influence on the adoption of improved cowpea technologies in Nigeria. Years spent on formal education had a significant and positive influence on adoption of improved cassava processing technologies. This implies that the more the number of years in formal education the more the women adopt innovation on

cassava technologies. Education enhances behavioural change (knowledge, skill, attitude and aspiration), because it informs and leads to the understanding of complex materials, value and use of innovations. The finding is in consonance with studies by Bivan (2000) and Abudu *et al*, 2014, which revealed that education has a significant influence on adoption of agricultural technologies.

The significant influence of household size on adoption of improved cassava processing technologies in this study implies that women with large household members will have the needed labour required for processing operations. Besides, they also have more mouths to feed and more income needs. They will therefore seek alternative ways of diversifying their livelihood to earn additional income. Credit accessibility was also found to have a significant influence on adoption of cassava technologies. Women with access to credit will adopt the new technologies than those with no access to credit. Credit availability can afford the women opportunity of acquiring the needed inputs and equipment for the processing activities. Access to credit is important in influencing adoption of agricultural technologies (Umar *et al*, 2014). Most processors may fear trying improved technologies because they do not have necessary financial resources to adopt such technologies. It is surprising that membership of social organization and number of extension contact did not have a significant influence on adoption of improved cassava technologies (Table 3). This could be because the cassava technology packages are transferred to them in women groups. This may therefore suggest that the women groups were not well organized. However a study carried out by Odurukew *et al*, (2006) revealed that membership of women organization had positive and significant influence on adoption of technologies by women. Besides, extension contacts were low, since the mean extension visit was about five times only in 2013.

Table 1. Percentage distribution of respondents according to their socio-economic characteristics (n = 100)

Socio –economic variables	%	Cum%	Mean
Age (years)			
20-29	15.0	15	
30-39	11.0	26	
40-49	40.0	66	51
50-59	22.0	88	
60-69	12.0	100	
Level education			
No formal education	23.0	23	
Primary education	34.0	57	
Secondary education	22.0	79	
Tertiary education	21.0	100	
Household size			
1-4	20.0	20	
5-8	58.0	78	
9-12	17.0	95	6.7
13-16	5.0	100	
Primary occupation			
Farming	32.0	32	
Civil servant	38.0	70	
Trading	30.0	100	
Membership of social organization			
0-1	53.0	53	
2-3	37.0	90	1.6
4-5	10.0	100	
No of extension contact in 2013			
0-2	36.0	36	
3-5	29.0	65	4.5
6-8	19.0	84	
9-11	16.0	100	
Access to credit facilities			
Yes	79.0	79	
No	21.0	100	
Sources of credit (n= 79)			
Thrift society	37.0	37	
Co-operative society	39.0	76	
Financial institution	24.0	100	

Table 2. Percentage distribution of respondents according to their sources of information on improved cassava processing technologies (n-100)

Sources of information*	N	Percentage (%)
WIA agents	92	92.0
Radio	15	15.0
Television	20	20.0
Friends/ Neighbors relations	32	32.0
Fellow processors	45	45.0
Meetings	20	20.0
Internet	3	3.0

*multiple response

Table 3: Multiple regression result of socio-economic factors influencing adoption of improved cassava technologies

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
Constant	3.706	322		11.501	055
Age	-876	.063	-651	-13.937	.046*
Years spent on formal ed	2.350	.078	3.10	30.271	.021*
Household size	.695	.039	.578	18.007	.035*
Primary occupation	-1.427	.050	-2.030	-28.543	.022*
No of social organization	.664	.063	.318	10.569	.060
No of extension contact	.278	.047	.179	5.955	.106
Credit	1.669	.086	1.825	19.435	033*

*significant at ≤ 0.05

4. Conclusion and recommendations

The women's major source of information on cassava processing technologies was from WIA agents. So the agents should intensify their contact with the women since they rely heavily on them. In addition, years spent on formal education had positive influence on adoption of improved cassava technologies. Therefore the women should be engaged in more training programmes to learn more about improved cassava processing technologies. This will help them to adopt more technologies. Adoption of such technologies will alleviate poverty among the rural women and improve their livelihood thereby enhancing household food security.

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