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Research Article

Does information sources improve the adoption of new technology? Evidence from cassava processing enterprise

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Abstract

The study was conducted to assess the level of adoption of improved cassava processing technologies by cassava processors in Oyo State, Nigeria. A multistage sampling technique was used to select 190 cassava processors in Oyo state. Data was collected through an interview guide while descriptive statistics was used to achieve the objectives. The mean age of the respondents was estimated at 47 years and 90.00% of the respondents were married. The mean household size and years of experience were 6 persons and 11 years respectively. The majority (64.21%) had a secondary occupation (64.21%) while 66.32% of the respondents received credit. Only 7.37% of the respondents received information from extension agents. About 92.63% get information from other sources like radio, fellow professors, friends, and relatives. The major constraints encountered by the respondents include inadequate credit facilities, inadequate extension contact high cost of cassava tubers, and high costs of hiring cassava processing machines. Therefore, extension services on improved cassava processing technologies should be intensified in the study area by offering services, especially in aspects that show low adoption in this study like the mechanical peeler and fryer.

Introduction

Agriculture has usually been regarded as the support of the Nigerian economy as it supplies food, and raw materials and generate domestic income for the majority of the population. Agricultural production has contributed to foreign exchange earnings, government revenue, and employment [1]. Technology has made relevant contributions to national progress and its usefulness has attained universal recognition both at national and international levels. In many developing countries including Nigeria, lack of appropriate technological and scientific knowledge application limits our agricultural and economic progress [2].

Cassava has become a basic raw material for many small-scale businesses such as cassava flour mills, bakeries, fast food firms, restaurants, and gari processing firms, and is currently an income-generating activity [3]. Cassava is virtually grown in all parts of Nigeria with rainfall greater than 100 mm and accounts for over 70% of the total production of tuber crops in Africa [3]. The major area where the crop is grown extends from the coast in the south to the middle belt. By zone, the north-central zone produces about 7 million tonnes of cassava a year. Benue and Kogi state in north-central Nigeria are the largest producers of cassava in the country [4]. Nigeria has been recognized as one of the leading producers of cassava in the world since 2002 [3]. Reasons adduced for this low level of access to and subsequent adoption of technological innovations particularly among users (women) include the lack of access to factors of production-land, labor, capital and limited authority for decision-making [5]. Users also find such innovations difficult to maintain even when they are appropriate for local conditions due to a lack of maintenance and skill training. Consequently, the levels of agricultural production in most developing countries remain low.

Government intervention and the efforts of non-governmental organizations have led to a number of measures that support the production, processing, and marketing of cassava. Through this effort, appreciable progress has been

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made in the development of processing technologies and rural infrastructure. Several labor-intensive operations in processing notably, grating, dewatering, and milling have been mechanized [6]. The use of appropriate technologies or machinery is essential to meet for home consumption and industrial uses. Consequently, upon this, it is needed to appraise the level of acquisition of these appropriate technologies in order to appreciate the prospects and constraints.

Problem statement

The Food and Agricultural Organization (2010) observed that in many developing countries, wide adoption of research results by farmers is quite limited. This is partly due to the fact that many of the farmers in developing countries live in rural areas where they have inadequate sources of information. About 75% to 80% of Nigerians live in rural areas relying on agriculture for their employment and yet spend a high proportion of their income on food because of low production and processing levels. This situation is further worsened by food losses that occur as a result of inadequate processing facilities [7]. Poor processing is a major cause of post-harvest losses in the world with special emphasis on developing countries such as Nigeria [8]. Cassava is the most perishable of the roots and tuber crops and can deteriorate within two or three days after harvest. So there is a need to process it within the shortest time after harvest. More so, cassava contains a poisonous substance called cyanogenic glucoside which is usually removed during processing. It is for this reason that instead of being sold as fresh produce like other roots and tubers, cassava is mostly sold as processed products.

This study provide answers to the following research questions

i. What are the socio-economic characteristics of cassava processors in the study area?

ii. What is the level of awareness of improved cassava processing technologies in the study area?

iii. What are the sources of information on improved cassava processing technologies in the study area?

iv. What is the level of adoption of improved cassava processing technologies in the study area?

v. What are the constraints to the adoption of improved cassava processing technologies in the study area?

Objectives of the study

The broad objective of the study was to examine the adoption of improved cassava processing technologies by cassava processors in Oyo State.

The specific objectives are to:

1. Describe the socio-economic characteristics of cassava processors in the study area,
2. Identify the level of awareness of improved cassava processing technologies in the study area
3. Identify the sources of information on improved cassava processing technologies in the study area
4. Assess the level of adoption of improved cassava processing technologies in the study area and
5. Identify the constraints militating against the adoption of improved cassava processing technologies in the study area

Justification for the study

Some studies have indicated that the adoption of an innovation is inclined by several factors which may be social, economic, innovation-related, technology development process-related, or even exogenous problems such as government policy and developments in the international showground (Bernet ,et al. 2001; Collinson 2001; Smith, et al. 1995; Agbamu 1995). Many of these studies have been conducted on new crop varieties and pest control practices. Interventions in the post-harvest sector are however required to ensure a supply of safe and suitable food to the population. Cassava processing is labor intensive, often characterized by low quality, low output per unit of time, and full of drudgery.

Some modern cassava processing technologies are in existence in Ibarapa East Local Government Area. However, enough research has not been conducted to study the factors that influence the adoption of improved cassava processing technologies by cassava processors and how they affect the quality and quantity of the processed products.

Methodology

The study was carried out in Oyo State, South Western Nigeria. It is an inland state in southwestern Nigeria, with its capital at Ibadan. It is bounded in the north by Kwara State, in the east by Osun State, in the south by Ogun State, and in the west partly by Ogun State and partly by the Republic of Benin. It has a tropical climate with rainforest vegetation on its southern part and a derived savannah on its northern end. It has an estimated land area of 28,454 square kilometers. The estimated human population is 5,580,894 (2006 population census) and it is characterized commercially by a dual economic focus, the bourgeoning industrial sector, and a dominant agricultural sector.

Sampling techniques

A multistage sampling technique was used to select 190 food crop farmers from 18 communities in two agricultural zones of Oyo State (Ibadan/Ibarapa and Saki).

The first stage involved the selection of two Zones which are Ibadan/Ibarapa and Saki randomly. The second stage involved the simple random selection of three (3) and two (3) blocks from each of the two ADP zones respectively making 6 blocks. Stage three involved the random selection of four (3) cells from each of the 6 blocks making 18 cells. The last stage involved the random selection of eleven (11) food crop farmers

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from each of the 18 cells making 198 food crop farmers while 190 respondents were selected. Primary data were collected using a structured interview guide. Data were analyzed using frequency count, percentage, mean, and Regression.

Socio-economic characteristics of respondents

Certain socio-economic and institutional characteristics were considered in this study in order to obtain valuable information on the effects of such variables on the adoption of improved cassava processing technologies. The socio-economic characteristics of the respondents are explained in Table 1. Table 1 showed that 10.53% of the respondents were between the ages of <30, 29.47% were between the ages of 31 - 40, 24.21% were between the ages of 41 - 50, while 21.05% and 14.74% were between the ages of 51 - 60 and 61 - 70 respectively. The mean age of the respondents is 47 which shows that most of the respondents are within their productive years to utilize cassava processing innovations transferred to them. This agrees with the finding of Odebode (2008) who reported that perception and adoption of innovation are mainly associated with the youthful and active age of the farmers. Marital status can be referred to as the state of being married or single. The result in Table 1 also showed that 8.42% of the respondents were single, 90.53% were married, and 1.05% were divorced respectively.

In addition, 30.53% of the cassava processors had tertiary education; those in secondary education were 38.93%, while those having primary education were 23.16%. Only a few (7.37%) of them had no formal education at all. This implies that they need more enlightenment from extension agents on the importance and usage of the improved technologies. Sofoluwe, et al. (2011) confirmed that education influences people's perception and adoption of innovations. 64.21% of the respondents had a secondary occupation, while the rest 37.79% had no secondary occupation; it also showed that respondents with a household size of 8 - 11 persons had the highest percentage 66.32%, followed by those with above 11, followed by those who had 4 - 7 with 12.62% and <4 households with 2.11%, respectively. The mean household size of the respondents was 6 persons. This is similar to Adebayo, et al. (2003) who reported an average household size of 7 persons. This implies that the larger the household size the more labour availability and the more income requirement to meet household needs.

Cassava processing experience of respondents

The result of the study in Table 2 showed that 4.21% of the respondents had processing experience of between 1 - 5 years, 49.47% had processing experience of between 6 - 10 years and 44.32% had processing experience of above 10 years. The mean number of years of processing experience was 11.42 years. This agrees with the findings of Bakut (2013) who asserted that farmers with long years of farming experience would be conversant with the constraints and this would increase their level of acceptance of new ideas as a means of overcoming their production constraints. In addition, most of the respondents work in groups (68.42%) and (31%) have their own enterprises.

Table 1: Distribution of Respondents According to Socio-economic Characteristics.

Variable	Frequency	percentage	Mean
Age (years)			
Less than 30	20	10.53	
31-40	56	29.47	
41-50	46	24.21	47
51-60	40	21.05	
Above 60	28	14.74	
Marital status			
Single	16	8.42	
Married	172	90.53	
Divorced	2	1.05	
Family size (Persons)			
Less than 4	4	2.11	
4-7	24	12.62	6
8-11	126	66.32	
Above 11	46	18.95	
Secondary occupation			
Yes	122	64.21	
No	68	35.79	
Educational status			
No formal	14	7.34	
Primary	44	23.16	
Secondary	74	38.95	
Tertiary	58	30.53	
TOTAL	190	100.00	

Table 2: Distribution of Respondents According to Years of Processing Experience.

Variation	Frequency	Percentage	Mean
Processing experience			
Less than 5	8	4.21	
6-10	94	49.47	
Above 10	88	46.32	14
Processing enterprise			
Owned enterprise	60	31.58	
Work in group	130	68.42	
Total	190	100.00	

Credit received by the respondents

Table 3: showed that only 66.32% of the respondents received credit while 33.68% of the respondents did not receive credit. This implies that the majority of the respondents have access to credit. The result also showed that credit from cooperatives was the highest at 40.00%, followed by banks with 29.47%. About 1.05% had credit from relatives and friends while 23.16% had credit from their husbands. Finally, 6.32% had credit from agricultural agencies. This Table also showed that the majority of the respondents got their credit in the form of cash 80.00% while 20.00% of them got their credit in the form of input i.e. the co-operative or other society will give them the machine and they will be paying the money back gradually.

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Extension contact with the respondents

Results presented in Table 4 showed that 64.21% of the respondents had no visit contact with the extension agent in the last year and 35.79% of the respondents had visit contact with the extension agents in the last year. Also, 11.58% of the respondents had a visit once in a year, 15.79% had a visit twice in a year and 8.42% had a visit thrice in a year. This implies that the rate of extension visits is inadequate. Hence they may not take up the adoption of the new technologies.

Awareness and sources of information on improved cassava processing technologies

Awareness of improved cassava processing technologies: Results in Table 5 showed that 100% of the respondents were aware of the mechanical grater. Equally, 100% were aware of the screw press; 85.26% were aware of the fryer (toaster), 75.79% were aware of the Mechanized peeler and finally, 100% were aware of the mechanical sifter. The mechanical grater, mechanized peeler and the screw press having 100% awareness imply that all the respondents were aware of the mechanical grater, mechanized peeler, and the screw press. Adoption of any technology is led by first hearing about the technology and then learning about it.

Table 3: Distribution of respondents according to the Credit received by the respondents.

Sources of credit	Frequency	Percentage
Obtained of credit		
Yes	126	66.32
No	64	33.68
Source of credit		
Husband	44	23.16
Bank	56	29.47
Co-operative	76	40.00
Relatives and Friends	2	1.05
Agricultural agencies	12	6.32
Form of assessing		
Cash	152	80.00
Input	38	20.00
Total	190	100.00

Table 4: Distribution of Respondents According to their Assess of the Extension Contacts with Frequency of Visit.

Extension contact	Frequency	Percentage
No	61	64.21
Yes	34	35.79
Frequency of visits in a year		
Once in a year	11	11.58
Twice in a year	15	15.79
Thrice in a year	8	8.42

Source: Field Survey, 2019.

Table 5: Distribution of Respondents According to the Level of Awareness of Improved Cassava Processing Technologies.

Processing Technologies*	Frequency	Percentage
Mechanical grater	190	100.00
Screw press	190	100.00
Mechanical sifter	190	100.00
Fryer(toaster)	162	85.26
Mechanized peeler	144	75.79

*Multiple response.

Sources of information on improved cassava processing technologies

Table 6 shows that 21.05% of the respondents got information on cassava processing from friends and relatives, 31.58% from fellow processors, 5.26% from radio 7.37% from television, and 7.37% from extension agents. This implies that fellow processors are the major source through which information was disseminated to the people in the study area.

Level of adoption of improved cassava processing technologies

Table 7 shows that the mechanical grater had the highest adoption level of 100%. This was followed by the screw press which had an adoption level of 100% and 1.05% of the respondent adopt a mechanical peeler. Finally, the mechanical sifter and the fryer (toaster) had adoption levels of 100% and 0 %respectively. The reason for the very low adoption level of the fryer (toaster) might be that the respondents prefer using the old and traditional method of frying gari, also to provide job opportunities and lack of credit facilities. The average level of adoption is 60% and this implies that the level of adoption of the improved cassava processing technologies is above average.

Production level of the respondent

Table 8 showed that 44.21% of the respondents were producing within the range of 11 bags - 15 bags per day and 43.15% of them were producing within the range of 6 bags - 10 bags. Also, 3.16% were producing below 5 bags while 9.48% of the respondents produced above 15 bags. This showed that the respondents had low production due to a lack of some machinery and the mean production was 11 bags. This table also showed that the majority of the respondents 97.89% had no weighing machine and only 2.11% of the respondents had a weighing machine. The respondents sold their product above ₦7000 (33.69%) while 57.89% of the respondents sold their product within the range of ₦6100 - ₦7000.

Constraints to adoption of improved cassava processing technologies

Table 9 shows the constraints encountered by the respondents in the adoption of improved cassava processing technologies. Table 9 shows that inadequate credit facilities as given by 95.79% of the respondents ranked 1st on the list of constraints. Inadequate credit is a major problem for the processors because without adequate credit they cannot fully

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adopt technologies thereby leading to a reduction in their productivity. Inadequate extension contact which ranked 2nd as 84.21% of the respondents either complained that they have never been visited by the extension agents or that the visits are not often. The table also shows that the high cost of machines and bad access roads ranked 3rd (70.53%) and 4th (53.68%) respectively. The high cost of transportation ranked 5th (47.37%) shows that below average the respondents spent a lot of money for transporting cassava tubers from the farm or market to the processing centers. There is also a high cost of transportation in moving their produce to market. In addition to that, the improved cassava processing machines are so expensive that most of them cannot afford it so they spend a lot of money in transporting their products to and fro the processing centers where they go in search of hired machinery. The high cost of cassava tubers ranked 6th (14.74%). Other constraints encountered are health problems like eye problems due to the heat and smoke coming out when using aluminum pans over firewood for frying and long distances to processing centers respectively [9-12].

Table 6: Distribution of Respondents According to Their Sources of Information on Improved Cassava Processing Technologies.

Sources of Information	Frequency	Percentage
Relatives and friends	40	21.05
Extension agent	14	7.37
Radio	10	5.26
Television	14	7.37
Sales Agent	52	27.37
Total	190	100.00

Table 7: Distribution of the Respondents According to Level of Adoption of Improved Cassava Processing Technologies.

Machines	Frequency	Percentage
Mechanical grater		
Agree	190	100.00
Disagree	0	0.00
Screw press		100.00
Agree	190	100.00
Disagree	0	0.00
Mechanical sifter		
Agree	190	100.00
Disagree	0	0.00
Fryer(toaster)		0.00
Agree	0	0.00
Disagree	190	100.00
Mechanical peeler		
Agree	2	1.05
Disagree	188	98.95

Source: Field Survey, 2019.

Table 8: Distribution of respondents according to the Production of the respondent.

Variation	Frequency	Percentage	Mean
Number of bag(s)/day			
Less than 5bags	6	3.16	
6 - 10 bags	82	43.15	
11 - 15 bags	82	44.21	13.6 bags
Above 15 bags	18	9.48	
Weight of the bag			
None	186	97.89	
65 kg	4	2.11	
Price per bag(₦)			
Less than 6000	16	8.42	
6100 - 7000	110	57.89	
above 7000	64	33.69	₦7001
Total	190	100.00	

Table 9: Distribution of respondents according to constraints to adoption of improved cassava processing technologies.

Constraints	Frequency	Percentage	Rank
Inadequate credit facilities	182	95.79	1
Inadequate extension contact	160	84.21	2
High cost of machines	134	70.53	3
Bad access road	102	53.68	4
High cost of transport	95	47.37	5
High cost of cassava tuber	28	14.74	6

Conclusion and recommendations

The study was carried out to provide the observed evidence of the state of awareness and adoption of improved cassava processing technology among cassava processors. The problems enumerated by the users in order of severity include the high cost of equipment, unavailability of sufficient machines, difficulty in operating machines, transport problems, heavy weight of equipment, health problems lack of essential infrastructural facilities, and insufficient extension staff to teach new innovations. The study provides the following recommendation based on the results emulated from the study:

1. The extension services on improved cassava processing technologies should be intensified in the study area by offering services, especially in aspects that show low adoption in this study like the mechanical peeler and fryer.

2. Cassava processors should form cooperative societies through which they can put their financial resources together for reinvestment and also through that they can benefit from microcredit schemes to boost their cassava processing enterprise.

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