Journal of Agriculture and Rural Development Studies
Volume 2 – Issue 4 – 2025
ISSN Online 3061-2756
www.imadr.jards.ugal.ro

DOI https://doi.org/10.35219/jards.2025.4.05

Assessing Users' Satisfaction with Cassava Processing Centre Via Nigerian Stored Products Research Institute (NSPRI) Adopted Villages Scheme in Isale Awe, Kwara State, Nigeria

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ARTICLE INFO

Article history:
Received: November 21, 2025
Accepted: November 30, 2025
Published: December 15, 2025

Keywords:
Postharvest technologies, Agro-processors, Satisfaction, adopted Villages Scheme, NSPRI, Nigeria

ABSTRACT

The study assessed users' satisfaction with cassava processing centre via Nigerian Stored Products Research Institute (NSPRI) Adopted Villages Scheme in Isale Awe, Kwara State, Nigeria. The population of the study includes all the agro-processors in the study area. A multistage sampling procedure was employed to select 48 respondents (cassava processors). The data acquired with a well-structured questionnaire were analyzed using descriptive and inferential statistics (Linear Regression model). The majority of the respondents were male (83.3%) and educated (66.7%) with a mean age and a mean household's size of 48.75±12.535 years and 9.08±4.471 respectively. Cassava processing centre provided by NSPRI was widely utilized (weighted mean score (WMS) of 2.58) by cassava processors in Isale Awe. Most of the respondents were more satisfied with the accessibility of the technology (WMS = 3.92). Moreover, 50.0 percent of the respondents were satisfied with NSPRI cassava processing centre on high level. High cost of maintenance (WMS = 2.17) remains the major challenge facing the utilization of cassava processing centre in the study area. The result of linear regression model indicated that age (t = 2.907***) and educational level (t = 3.404***) were significantly related with the level of satisfaction of NSPRI technology. Since educational level is an important determinant of users' satisfaction with cassava processing centre provided by NSPRI, there is adequate need for advocacy for acquisition of quality education to further enhance effective utilization of technology with attending better output and higher return to investment.

1. Introduction

Cassava (*Manihot esculenta*) had gained a tremendous popularity as an essential crop with adequate capacity in ensuring food security in Nigeria (FAO, 2018). Moreover, cassava can be consumed raw but it is mostly processed (cassava flakes, cassava flour, and cassava paste) before consumption. In this respect, Westby, 1991; Oyewole and Eforuoku (2019) reiterated that over eighty percent of cassava

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domiciled in Africa is utilized as human food while about 50 percent often transformed into processed products. Conversely, Njoku and Muoneke (2008) noted that at least an average of one bye product of cassava is consumed on daily basis among 7 out of every 10 Nigerians. Affirming the nutritional importance of cassava and its products on a global scene, FAO (2015) endorsed cassava as a extensively acceptable energy food source to over 600 million consumers. It is a known fact that traditional methods of processing cassava is labour-intensive. Meanwhile, advancement in technological innovations that paved way for the intensive use/application of improved processing technology has reduced processing time and labour thereby potentially engendered increased production. Despite increasing development and dissemination of improved processing technologies, the industrial utilization of cassava products still accounts for less than 5% of the total production probably due to inaccessibility of small holder agro-processors to improved technologies emanating from the National Agricultural Research Institutes (NARIs) (Shittu *et al*., 2016). This shows there is more to be desired in the nation's cassava processing sub-sector especially in respect to utilization of improved postharvest technologies.

In order to facilitate the dissemination of improved technologies to small holder agro-processors, the Adopted Villages Scheme (AVS) was introduced to the National Agricultural Research Institutes (NARIs) in Nigeria and the Agricultural Research Council of Nigeria in 1996 under the World Bank Assisted Programme of National Agricultural Research Project (NARP) (ARCN, 2008). Each Institute/College of Agriculture is expected to identify two communities/schools not more than twenty kilometers away from its official location within their mandate areas. Furthermore, the institute will select farmers where the farms or fields will be used as 'show room' for the communities of the impact of the technologies they are promoting. The selected communities are to help in the early evaluation and dissemination of the technologies generated by a particular research institute in its mandate crops (IAR&T, 2009).

In line with the directive, Nigerian Stored Products Research Institute (NSPRI) identified and established the AVS in Isale Awe community in Asa Local Government Area (LGA), Kwara State, Nigeria as a new approach in the dissemination of improved postharvest technologies to end users. The objectives of establishment and management of the adopted villages are: provision of opportunity for community entry and confidence building; facilitation activities; training and empowerment activities; development activities; promotional and extension activities; and establishment and management of outreach centres/secondary schools.

However, since the establishment of the adopted village scheme in Asa Local Government Area of Kwara State, there has not been any empirical study into the users' satisfaction with the available postharvest technology in the area. This study was therefore designed to provide empirical information on the users' satisfaction with cassava processing centre via NSPRI Adopted Villages Scheme in Isale Awe community, Kwara State, Nigeria.

2. Literature review

2.1. Technology/innovation Transfer

The multifaceted roles (connection between academia and industry, enhancement of multi-sectorial collaboration, and resources and supports for upcoming businesses) of technology transfer cannot be overemphasized especially in facilitating innovation thereby engendering commercialization progression and by extension helps organizations to unlock the full potential of their innovative ideas.

Innovativeness measures the extent to which an individual believes he or she is at the forefront of trying out new technology-based products and/or services (Demirci and Ersoy, 2020). Technology readiness explains the possibility of someone appreciating and applying new technologies. At the same time, innovation defined in the product development literature is one's willingness to adopt new products (Ricardo and Bianca, 2019). In tandem with the aforementioned definition, Blut and Wang (2019) opined that individuals with a high degree of inherent innovativeness will more likely adopt and test run new technologies due to willingness for advancement at all times. Innovativeness is related to people's inclination to explore and try new things (Parasuraman and Colby, 2001). Innovative people prefer to explore their world which makes them more open to accepting new technology. Another key aspect of innovativeness is the tendency for people to collect and share information. Innovative individuals prefer learning new things and developing as they would then tell other people what they have learned. In general, innovative consumers play an important role in giving advice to other consumers (Parasuraman and Colby, 2001). People with high innovativeness traits have been described as those who possess powerful inherent inspiration when it comes to the use of new technology as they cherish the excitement of trying the innovation (San-Martín, 2018). Gaitan (2019) added that the innovativeness trait symbolizes the extent to which an individual wants to try a new technology, services and products.

2.2. Customer Satisfaction

Customer satisfaction has been a critical term in business that has received extensive attention among researchers and practitioners. Customer satisfaction has gained centrality in marketing literature because of its importance as a key component of business strategy and an aim for business activities, especially in today's competitive market. Notably, several scholars (Gunasundari and Kulkarni, 2022; Rajathi and Siva, 2018) had established the positive influence of customer satisfaction on an organization's profitability especially through repeat purchase. Hadiyati (2019) has further submitted that customer satisfaction is a feeling of preference of a person, emanating from comparing a product or service overall capability (or result) towards his or her expectations? Satisfaction is the customers or clients experience that have experienced or received contact with the organization. Satisfaction on the other hand, is about the specific experience customers who have received various stages of service (Humayon *et al*., 2018). It means that customers have high expectations of the role of the employees of an organization especially, for the front-line staff; therefore, the successful meeting of customer expectations will reflect their satisfaction. Today most successful companies have taken the strategy of raising expectations and delivering performance to match. Such companies track their customers" expectations, perceived company presentation, and customer satisfaction. Highly satisfied customers produce several benefits for the company. Satisfied customers remain connected for a longer period and talk favourably to others about the company and its products/services.

3. Methodology

Research Location: The research was carried out in Isale Awe Village. It was situated in Asa Local Government Area of Kwara State. The study area with an estimated population of 142,275 (National Population Census (NPC), 2006) is sited at an altitude of 267 meters above sea level at a coordinates of 8º37'0'N and 4º22'60'E in DMS or 8.61667 and 4.38333 in decimal degrees respectively. The area is associated with the rainy and the drying seasons. The annual rainfall received in this region is very moderately high, usually above 1,800 mm. Temperatures are fairly uniform throughout the year and

the differences between day and night are slight. Isale Awe stands as a booming agricultural center in Kwara State with a rich farmlands and bustling trade. It serves as a vital marketplace where farmers and traders converge on market days. The major crops in Isale Awe are vegetables, yam, cassava and maize. The study area is dominated mainly by Yoruba people. Isale Awe Village is within a 20 km radius from the Kwara State capital, Ilorin (LCRI, 2009). The village is within the mandate area of NSPRI and is also into mass production of the mandate commodity of the research institute, this qualifies her to be one of the adopted villages of NSPRI in line with the directive of the Agricultural Research Council of Nigeria (ARCN, 2008).

Population of the study: the population of the study include all the agro-processors in the study area.

Sampling technique and sample frame: A three stage sampling method was employed in selecting 48 respondents for this research work. Firstly, there was a purposive selection of Isale Awe village since it is one of the adopted villages within the jurisdiction of NSPRI and well known for cassava processing. Secondly, there was random selection of four (4) cells out of the eight (8) cells in Isale Awe village. The last phase entailed random selection of twelve (12) cassava processors from each of the four (4) cells selected thereby cumulating into forty eight (48) respondents as the sample frame/size.

Source of data collection: structured questionnaire and unstructured interview guide were used to obtain primary data for this research work.

Data analysis: Both descriptive statistics and inferential statistics (Linear Regression Model) were used in analyzing the data collected.

Measurement of variables: The level of satisfaction with cassava processing technology provided by NSPRI were obtained using a typical 5-Likert scale namely; Outstanding with a score of 5; Exceed Expectation with a score of 4; Meet Expectation with a score of 3; Below Expectation with a score of 2 and Need Improvement with a score of 1. The benchmark was obtained by adding 5+4+ 3+2+1 = 15 which is divided by 5 to give 3.0. Any mean score of 3.0 and above is favorable, otherwise not favourable (Author defined). The challenges in the utilization of cassava processing technology were obtained using a 4-point scale namely; Very Severe with assigned score of 3, Severe with assigned score of 2, Moderately Severe which was given a score of 1 and Not Severe with a score of 0.

4. Research Findings and Explanation

Respondents' Characteristics at Isale Awe Village

Table 1 showed that the cassava processors belonged to different age groups including 41-50 years age group (41.7%), above 50 years age group (33.3%), 31-40 years age group (16.71%) while within 30 years age group (8.3%). The majority of the target audience had a mean age of 48.75±12.535 years. This age group distribution is an indication that the respondents are still very agile and can adequately engage in cassava processing operations. Similarly, the mean age in this research work is higher than the mean ages of 43 and 42 years recorded in Kwara State and Kogi State respectively as reported by Adedoyin *et al*. (2025).

It was also revealed that majority (83.3%) of the target audience were male as only few (16.7%) were female. The finding indicated that cassava processing is a male dominated business. The current finding

negates general assumptions from the previous studies of Ikwu-Oche *et al*. (2024) who reported that cassava processing industry is dominated by married women. Table 1 also indicated that 64.3 percent of the target audience associated with households with 6-10 members. Moreover, 28.6 percent of them were grouped among households with more than 10 members while only 7.1 percent of the respondents had between 1-5 members in their households. Moreover, the average member of the households was found to be 9.08±4.471 indicating a very large household size. This large household size could be utilized to carry out cassava processing thereby reducing the cost of labour. This is in agreement with the views of Adeniyi *et al*. (2023) who reported that having large to medium household size is favourable as members would be used as source of labour thus reducing labour cost and increasing processing capacity of the household.

Table 1 also indicated that 67.7 percent of study audience had formal education as 33.3 percent of the target audience did not have formal education. Among the educated audience, 41.7 percent of them acquired primary school education, 8.3 percent attained secondary education, 0.0 percent secured tertiary school education while 16.7 percent of them obtained non-formal education. The finding vividly connotes the fact that most of the respondents were educated which could be an important determinant of customer satisfaction with the technology.

Table 1. Respondents Distribution based on their Socio-Economic Characteristics

Respondents' Biodata	Frequency	Percentage
Age range (Years)		
≤30	4	8.3
31-40	8	16.7
41-50	20	41.7
Above 50	16	33.3
Total	48(100.0)	100.0
Mean	48.75	
Standard deviation	12.535	
Range	Minimum= 23 Maximum = 65	
Sex		
Male	40	83.3
Female	8	16.7
Household size		
1-5	12	25.0
6-10	24	50.0
Above 10	12	25.0
Mean	9.08	
S.D	4.471	
Educational level		
No formal education	16	33.3
Primary school	20	41.7
Secondary school	4	8.3
Tertiary school	0	0.0
Non-formal education	8	16.7

Source: Data analysis Outputs, 2025

Available NSPRI Technology

According to Table 2, all (100.0%) of the respondents indicated the availability of cassava processing unit/centre provided by NSPRI in their area. The finding therefore revealed that cassava processing unit established by NSPRI is readily available for use within the research location.

Table 2. Distribution of respondents by available NSPRI Technologies in the study area

NSPRI Technology	Frequency	Percentage
Cassava processing centre	48	100.0

Source: Data analysis Outputs, 2025

Satisfaction with NSPRI Technology at Isale Awe

Table 3 presented the distribution of respondents by the level of satisfaction with NSPRI Technology (cassava processing centre) at Isale Awe community. The result in the Table 3 indicated that most of the respondents were more satisfied with the accessibility of the technology with a weighted mean score (WMS) of 3.92. Others in the rank order of satisfaction include quality of products (colour, taste and odour) (WMS = 3.83), timeliness of action/result/output (WMS = 3.83), location of the technologies (WMS = 3.08), ease of use (operational design) (WMS = 3.08), capacity (WMS = 2.58), technology status/condition (WMS = 2.25), safety of products (WMS = 2.25) and organizational supports (WMS = 1.75). This finding implies that accessibility of the technology is a good determinant of the level of satisfaction with NSPRI technology in the study area. In order to test the adequacy of any technology in meeting the aspirations of the end users, it must be readily accessible. Customer service provided by this technology can either be or both tangible and intangible which implies that end users need to see, feel, or even test run the technology to proof its ability in meeting their anticipations. Therefore, a technology according to Hadiyati (2019) is considered to be satisfying when it meets the aspirations of the end users. In that respect, service providers offer products or services that match a customer's expectations and hope to satisfy the customer and pay attention to them with their excellent customer services (Rajathi and Siva, 2018). The higher the satisfaction or attention, the more guaranteed the customer loyalty (Cheung and Lee, 2005). In line with current finding, Dewi Sanjaya and Martono (2012) identified service quality as the major factor that determines customer's satisfaction with a given technology.

Table 3. Distribution of respondents by available NSPRI Technologies in the study area

NSPRI Technology	O	EE	ME	BE	NI	WMS	Rank
Quality of products (color taste odour)	20(41.7)	8(16.7)	16(33.3)	0(0.0)	4(8.3)	3.83	2nd
Accessibility	20(41.7)	8(16.7)	16(33.3)	4(8.3)	0(0.0)	3.92	1st
Timeliness of action/result/output	20(41.7)	4(8.3)	20(41.7)	4(8.3)	0(0.0)	3.83	2nd
Capacity	8(16.7)	4(8.3)	12(25.0)	8(16.7)	16(33.3)	2.58	6th
Location	8(16.7)	8(16.7)	20(41.7)	4(8.3)	8(16.7)	3.08	4th
Technology status/condition	8(16.7)	0(0.0)	12(25.0)	4(8.3)	24(50.0)	2.25	7th
Safety of products	16(33.3)	4(8.3)	16(33.3)	0(0.0)	12(25.0)	2.25	7th

NSPRI Technology	O	EE	ME	BE	NI	WMS	Rank
Ease of use (operational design)	16(33.3)	0(0.0)	16(33.3)	4(8.3)	12(25.0)	3.08	4th
Organizational supports	0(0.0)	4(8.3)	8(16.7)	8(16.7)	28(58.3)	1.75	9th

O = Outstanding (5); EE = Exceed Expectation (4); ME = Meet Expectation (3); BE = Below Expectation (2); NI = Need Improvement (1)

Source: Data analysis Outputs, 2025

Categorization of level of satisfaction with NSPRI Technology at Isale Awe

Table 4 presented the distribution of respondents by categorization of level of satisfaction with NSPRI Technology at Isale Awe village. About half (50.0%) of the target audience were satisfied with NSPRI cassava centre on high level, about 41.7 percent of them were satisfied with NSPRI cassava centre on moderate level while a few (8.3%) of them were satisfied with NSPRI cassava centre on low level. From the result of the finding, it was observed that cassava centre at Isale Awe recorded high satisfaction rate among the cassava processors indicating the fact that this innovation had contributed immensely to cassava processing in the study area. This feeling of satisfaction with this technology will more likely engender high level of loyalty to Nigerian Stored Products Research Institute's technological transfer agenda. In line with this assumption, other authors (Foroudi *et al*., 2018) reiterated that loyal customers (end users) are likely to share positive news about the technology that meets their expectations especially through word of mouth and on social media. This suggests that customer satisfaction serves as an avenue for any customers' oriented organization to gain the confidence of consumers, and thereby ensuring continual use of particular products/services especially through the provision of reliable and demand driven services in the society (Merek, 2018; Susanti, 2018; Nurlia, 2019).

Table 4. Distribution of respondents by categorization of level of satisfaction with NSPRI Technology at Isale Awe

NSPRI Technology	Categorization of satisfaction with NSPRI Technology		
	High	Medium	Low
Cassava processing centre	24(50.0)	20(41.7)	4(8.3)

Source: Data analysis Outputs, 2025

Challenges faced in the utilization of NSPRI Technology

Table 5 presented the distribution of respondents by challenges faced in the utilization of NSPRI Technology at Isale Awe community. The challenges faced in the utilization of NSPRI Technology at Isale Awe community in the rank order include high cost of maintenance (WMS = 2.17), high cost of technology (WMS = 1.67), poor coordination (WMS = 1.43), limited capacity (WMS = 1.25), poor collaboration (WMS = 1.17), lack of training (WMS = 1.08), technical know-how (WMS = 0.67) and inadequate access to technology (WMS = 0.42). From the result of the finding, it was observed that the effects of the challenges faced in the utilization of NSPRI Technology among the cassava processors at Isale Awe community was below average indicating that the challenges were not significant enough to undermine the contribution of NSPRI technology to overall development in cassava processing in the study area. However, high price of any technology can affect the level of patronage of the technology

thereby undermining the expected coverage of the technology. Similarly, previous studies (Dewi Sanjaya and Martono, 2012; Roring, Oroh and Gulla, 2015) indicated that the price tag is one of the determinants of customer satisfaction. Similarly, some authors (Natasja Hosang, Tumbel, and Moniharapon, 2016) had also studied the influence of price on customers' satisfaction.

Table 5. Distribution of respondents by challenges faced in the utilization of NSPRI Technology

Challenges	VS	S	MS	NS	WMS	Rank
Technical know-how	4(8.3)	0(0.0)	20(41.7)	24(50.0)	0.67	7th
Limited capacity	4(8.3)	12(25.0)	24(50.0)	8(16.7)	1.25	4th
Poor collaboration	4(8.3)	16(33.3)	12(25.0)	16(33.3)	1.17	5th
Poor coordination	8(16.7)	16(33.3)	12(25.0)	12(25.0)	1.43	3rd
High cost of technology	12(25.0)	16(33.3)	12(25.0)	8(16.7)	1.67	2nd
Inadequate access to technology	0(0.0)	0(0.0)	20(41.7)	28(58.3)	0.42	8th
High cost of maintenance	28(58.3)	4(8.3)	12(25.0)	4(8.3)	2.17	1st
Lack of training	12(25.0)	0(0.0)	16(33.3)	20(41.7)	1.08	6th

VS = Very Severe (3), S = Severe (2), MS = Moderately Severe (1), NS = Not Severe (0)
Mean = 9.83; S.D = 4.610

Source: Data analysis Outputs, 2025

Hypothesis

Influence of selected Socio-economic characteristics and level of satisfaction with NSPRI Technology in Isale Awe community

Table 6 presented the result of linear regression model showing the relationship between selected socio-economic characteristics and level of satisfaction with NSPRI technology in Isale Awe community. It was revealed that age (t = 2.907***) and educational level (t = 3.404***) were significantly related with the level of satisfaction of NSPRI technology. The relationship was significant at 5% level indicating the fact that household size and educational level are strong determinants of the level of satisfaction with the usage of a technology. Surely, a year increase in the years of education of the household head will lead to 30.5 percent increase in the likelihood of a household's satisfaction with usage of cassava processing technology provided by NSPRI being in Isale Awe. This is because educated individuals will be able to adopt new technologies that have potential to reduce stress and capable of boosting their production level. In fact, a unit increase in age of individuals will result in 2.91 percent increase in the likelihood of the household being food insecure. Honestly, education standing and age seems to guarantee better insight through adequate analysis, exposure and acquisition of requisite knowledge about diverse issues. So, education and age help in determining individual's needs and expectations hence, determinants of satisfaction. For instance, quality assessment starts from their needs and ends on their perception. Invariably, there is high propensity of satisfaction when the needs and expectations are guaranteed.

Table 6. Relationship between selected Socio-economic characteristics and level of satisfaction with NSPRI Technology

Variables	B-Value	Standard Error	t-value	p-value
Constant	16.911	5.388	3.139	0.003
Age	0.291	0.100	2.907***	0.006
Household size	0.381	0.245	1.557	0.127
Educational Level	3.053	0.897	3.404***	0.001

R = 0.515; R2 = 0.266; Adj.R2 = 0.216; Std. Error of the Estimate = 7.191; F-statistics = 5.306
***Significant at 1% level

Source: Data analysis Outputs, 2025

Influence of challenges faced in the utilization of NSPRI technology and level of satisfaction with NSPRI Technology in Isale Awe community

Table 7 presented the result of linear regression model showing the relationship between challenges faced in the utilization of NSPRI technology and level of satisfaction with NSPRI Technology.in Isale Awe community. It was revealed that challenges index (t = -2.855***) was significantly related with the level of satisfaction of NSPRI technology. The relationship was inversely related but significant at 1% level indicating the fact that challenges faced with the utilization of NSPRI technology is a strong determinant of the level of satisfaction with the usage of technology. In fact, challenges faced in the utilization of NSPRI technology had a 32.24 percent chance of increasing the level of satisfaction with NSPRI Technology.in Isale Awe community.

Table 7. Relationship between challenges faced in the utilization of NSPRI technology and level of satisfaction with NSPRI Technology

Variables	B-Value	Standard Error	t-value	p-value
Constant	3.979	2.919	1.363	0.180
Challenges index	0.3224	0.078	-2.855***	0.006

***Significant at 1% level
R = 0.392; R2 = 0.154; Adj.R2 = 0.116; Std. Error of the Estimate = 4.333; F-statistic = 4.097

Source: Data analysis Outputs, 2025

5. Conclusion and Recommendations

The beneficiaries were highly satisfied with the cassava processing centre provided via Nigerian Stored Products Research Institute Adopted Villages Scheme' in Isale Awe community in Asa Local Government Area of Kwara State. This was because the technology was delivered without cost and readily accessible by the end users thereby fulfilling their needs and expectations.

Recommendations

i. Provision for loan disbursement should be made under the scheme so as to empower the beneficiaries to adopt and disseminate improved technologies in the study area;

ii. Basic inputs should be made adequate and at subsidised rates to enable beneficiaries to take advantage of technology complimentarily since most agricultural-based technologies are multicomponent packages;

iii. The scheme should work with women groups as part of the guidelines given by ARCN in order to ensure family empowerment;

iv. NSPRI must see to it that the technologies developed are not only economically viable, technologically feasible, socially acceptable, ecologically adaptable but also culturally compatible to the existing agricultural practices of the end users.

Aknowledgements

We sincerely applaud efforts of all the staff members of Research Outreach Department, Nigerian Stored Products Research Institute, Ilorin, Nigeria for supporting in data collection exercise of the research work.

Author contribution statement

Patrick K Orimafo: Conceived and designed the research work.

David Ahmed Adamu, Ismail Oladeji Oladosu: gave technical insights of the work.

Others: helped in proofreading and language correction.

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