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APPRAISAL OF THE LEVEL OF USAGE OF NIGERIAN STORED PRODUCTS RESEARCH INSTITUTE POSTHARVEST TECHNOLOGIES AMONG VEGETABLE HANDLERS IN LASOJU VILLAGE, KWARA STATE, NIGERIA

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Abstract. This study examined the level of usage of NSPRI postharvest technologies among vegetable handlers in Lasoju Village, Kwara State, Nigeria. The research was conducted in Lasoju Village, and the study population comprised all vegetable handlers in the area. A multistage sampling procedure was employed to select 42 respondents. Primary data were obtained using a well-structured questionnaire and interview guide. The collected data were analyzed using descriptive and inferential statistical tools.

The results showed that the respondents had a mean age of 52.62 ± 10.98 years and a mean household size of 10.14 ± 5.61 . The majority were female (78.6%) and had no formal education (87.5%). All respondents (100%) reported the availability of vegetable sheds provided by NSPRI, while only 14.3% indicated awareness of the NSPRI vegetable basket. Most respondents reported a high level of utilization of both the NSPRI vegetable shed (85.7%) and vegetable basket (83.3%).

Limited capacity (Weighted Mean Score = 1.29) was identified as the major challenge affecting the use of NSPRI postharvest technologies in the community.

The linear regression analysis revealed that education level ($t = 2.728^{***}$) had a significant positive relationship with the level of usage of NSPRI postharvest technologies. Given the critical role of education in technology adoption, there is a strong need for sustained advocacy and investment in quality education to enhance the effective utilization of postharvest technologies, thereby improving productivity and returns on investment.

Keywords: *Vegetable shed, vegetable basket, handlers, postharvest technologies, level of usage, NSPRI.*

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INTRODUCTION

Background to the Study

Postharvest losses constitute a significant challenge to food security in Nigeria, with an estimates indicating that between 20% and 35% of harvested crops are lost due to inadequate handling, storage, and transportation practices [1, 2]. These losses not only reduce the quantity and quality of food available but also have economic implications for farmers and the agricultural sector at large. The adoption of postharvest technologies (PHTs) is crucial in mitigating these losses especially in Nigeria. However, the extent to which handlers which comprises of farmers, traders, and processors utilizes these technologies remains sub-optimal [3].

Nigeria's agricultural sector is predominantly characterized by smallholder farmers who often lack access to modern postharvest technologies [4]. Research indicates that while awareness of PHTs is relatively high, actual adoption rates are low. For instance, a study in Ilorin metropolis, Kwara State, found that although 98.2% of grain traders were aware of improved postharvest storage technologies, only 51.5% utilized those technologies [5]. Similarly, in Katsina State, factors such as limited availability, high initial costs, and labour intensity were identified as major constraints to the adoption of tomato postharvest technologies [6].

Government and stakeholders in the agricultural sectors have, through research and innovation develop strategies that help reduces losses. Despite the availability of various postharvest technologies designed to reduce losses and improve food security, their utilization among handlers in Nigeria remains low. This under-utilization is attributed to several factors, including socio-economic constraints, limited access to credit, inadequate training, and insufficient extension services. Understanding these factors is essential for developing targeted interventions to enhance the adoption of PHTs and, consequently, reduce postharvest losses. Against these backdrops this study seeks to appraise the level of usage of NSPRI Postharvest Technology among vegetable handlers in Lasoju village, Kwara State, Nigeria. The study objectives include: examine the socio-economic characteristics of the respondents; identify the available NSPRI postharvest Technologies in the study area; assess level of utilization of postharvest technology; and determine challenges faced in the usage of NSPRI postharvest Technologies.

MATERIAL AND METHODS

Study Area: The study was carried out in Lajosu village in Asa Local Government Area of Kwara State, Nigeria. It is located at an elevation of 316 meters above sea level and its population amounts to 174,152 in National Population Census (NPC) [7]. Its coordinates are 8°22'0"N and 4°25'59"E in DMS (Degrees Minutes Seconds) or 8.36667 and 4.43333 (in decimal degrees). It is a tropical savanna, wet area. It is an area known for vegetables production. Other major crops in the area include yam, cassava and maize. The study area is dominated mainly by Yoruba people.

Population of the study: the population of the study includes all the vegetable handlers in the study area.

Sampling procedure and sample size: A multistage sampling procedure was employed to select 42 respondents for the study.

The first stage involved purposive selection of Lasoju village since is one of the adopted villages in Asa Local Government Area of Kwara State while the second stage involved the random selection of four (4) cells out of the eight (8) cells in Lasoju village. The third stage involved the proportional selection of forty two (42) respondents as the sample frame for the study.

Source and type of data: Primary data were used for this study. The primary data were obtained with the aid of a well-structured questionnaire.

Data analysis: The data collected were analyzed using descriptive statistics and inferential statistics (Linear Regression model).

Measurement of variables: The level of usage of NSPRI postharvest technologies was obtained using a 4-point Likert scale namely; always = 3, sometimes = 2, rarely = 1 and never = 0. The benchmark was obtained by adding $3+2+1+0 = 6$ which is divided by 4 to give 1.5. Any mean score of 1.5 and above is high level of usage, otherwise low level of usage (Author defined).

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the vegetable processors

Table 1 presents the socio-economic characteristics of the vegetable handlers. The results in Table 1 showed that 69.1 percent of the respondents were above 50 years of age, 19.1 percent of the respondents were between 31-40 years of age, 7.1 percent of the were between 41-50 years n age while only 4. 8 percent of the respondents were between 20-30 years of age. The mean age of the respondents stood at 52.62 ± 10.977 years. This implies that the respondents are still in their economically active age and can be engaged in vegetable processing activities. This finding is in tandem with the earlier study of [8] who stated that individuals who are in active age group are highly productive in their undertakings.

The results in the Table 1 showed that majority (78.6%) of the respondents were female while only few (21.4%) were male. This finding indicated that vegetable handling/processing is a female dominated business in the study area. This is similar with the work of other authors [9] who claimed that cassava processing and vegetable handling/processing enterprise is occupied by married people (especially the women).

Table 1 indicated that 64.3 percent of the respondents had between 6-10 members in their households, 28.6 percent of the respondents had more than 10 members in their households 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 10.14 ± 5.607 indicating a very large household size.

Table 1 showed the distribution of respondents by educational level. It was indicated that 57.1 percent of the respondents had no formal education. However, 26.2 percent of the respondents had primary school education, 9.5 percent had secondary education, 2.4 percent had tertiary school education while 4.7 percent of the respondents had non-formal education. The finding vividly connotes the fact that most of the respondents were not educated which could go a long way in influencing the level of adoption of technology as related to vegetable handlings. It will be very difficult for a farmer who cannot read to access agricultural information in print media.

Table 1. Distribution of respondents by Socio-Economic Characteristics (n = 42)

Socio-Economic Characteristics	Frequency	Percentage
Age range (Years)		
20-30	2	4.8
31-40	8	19.1
41-50	3	7.0
Above 50	29	69.1
Mean	52.62	
S.D	10.977	
Sex of the Respondents		
Male	9	21.4
Female	33	78.6
Household size		
1-5	3	7.1
6-10	27	64.3
Above 10	12	28.6
Mean	10.14	
S.D	5.607	
Educational level		
No formal education	24	57.1
Primary school	11	26.2
Secondary school	4	9.5
Tertiary school	1	2.4
Non-formal education	2	4.7

Source: Survey, 2025.

Available NSPRI postharvest Technologies in the study area

Table 2 presented the distribution of respondents based on the availability of NSPRI postharvest technologies in the study area. The result in the table 2 indicated that all (100.0%) of the respondents indicated the availability of vegetable shed provided by NSPRI in their area while only 14.3% of the respondents identified with the NSPRI vegetable basket to handle their vegetable business. The finding therefore revealed that vegetable shed constructed by NSPRI is readily available for the use of vegetable handlers in the study area.

This finding is in tandem with the assumption of [10] who believed that access to improved technologies will expose the end users to agricultural information and technology, which will enhance productivity and improve household food security.

Table 2. Distribution of Respondents by available NSPRI Postharvest Technologies in the Study Area

NSPRI Technology	Frequency *	Percentage
Vegetable shed	42	100.0
Vegetable basket	6	14.3

*Multiple Responses , Source: Survey, 2025

Level of utilization of NSPRI postharvest Technologies in Lasaju Village

Table 3 presented the distribution of respondents by level of usage of NSPRI postharvest technologies in Lasaju village.

The result in table 3 indicated that vegetable shed was the most widely utilized NSPRI postharvest technologies in Lasoju village with a weighted mean score (WMS) of 2.64 while vegetable basket recorded the lowest level of usage score (WMS = 0.43). The high usage score recorded by NSPRI vegetable shed in the study area may be connected with the benefits derivable by its usage which probably would have encouraged the vegetable handlers in constant use of the technology. Conversely, end users are more likely to make use of a given technology which seems to have relative advantage over the existing technologies. It must be mentioned that the level of usage of NSPRI postharvest technologies among the vegetable handlers is a clear indication that they are highly innovative. In tandem with this view, other scholar [11] opined that people with high innovativeness traits possess powerful inherent inspiration when it comes to the use of new technology as they cherish the excitement of trying the innovation.

Table 3. Distribution of Respondents by Level of Usage of NSPRI Postharvest Technologies in Lasoju Village

NSPRI Technologies	A	S	R	N	WMS	Rank
Vegetable shed	33(78.6)	3(7.1)	6(14.3)	0(0.0)	2.64	1 st
Vegetable basket	6(14.3)	0(0.0)	0(0.0)	0(0.0)	0.43	2 nd

Keys: A = Always (3); S = Sometimes (2); R = Rarely (1); N = Not at all (0)

WMS = Weighted Mean Score

Source: Survey, 2025

Categorization of level of utilization of NSPRI postharvest Technologies in Lasoju Village

Table 4 presented the distribution of respondents by categorization of level of usage of NSPRI postharvest Technologies in Lasoju village. The result in table 4 indicated that 85.7 percent of the respondents used NSPRI vegetable shed on high level, about 4.8 percent of the respondents used NSPRI vegetable shed on moderate level while 9.5 percent of them made use of the technology on a low level.

Moreover, for the vegetable basket, 83.3 percent of the respondents used the technology on high level, about 16.7 percent of the respondents used vegetable basket on moderate level while 0.0 percent of the respondents used vegetable basket on low level.

The level of utilization obtained in this study is higher than the value (51.1%) by [5] among the grains traders in their study in Ilorin metropolis, Kwara State.

The study claimed that 98.2% of grain traders were aware of improved postharvest storage technologies but only 51.5% utilized them. From the result of the current finding, it was observed that both technologies are used on high level indicating the fact that those technologies had been of help in addressing the past challenges associated with vegetable handlings. The finding is a clear indication that NSPRI technologies had contributed to reducing the postharvest losses especially in vegetable handling which further established the fact that the institute is vigorously fulfilling her mandate and therefore serves as a leading force in tackling and addressing the issue of agriculture postharvest losses.

This development will surely make investment in agricultural products a lucrative venture at various stage of food value chain system thereby enhancing sustainable food availability, accessibility, food safety which will invariably ensure adequate food security.

Table 4. Distribution of Respondents by Categorization of Level of Usage of NSPRI Postharvest Technologies

NSPRI Technologies	Categorization of Level of Usage of NSPRI Postharvest Technologies		
	High	Medium	Low
Vegetable shed	36(85.7)	2(4.8)	4(9.5)
Vegetable basket	5(83.3)	1(16.7)	0(0.0)

Source: Survey, 2025

Challenges faced in the usage of NSPRI postharvest Technologies

Table 5 presented the distribution of respondents by challenges faced in the usage of NSPRI postharvest Technologies in the study area. The challenges faced in the utilization of NSPRI postharvest Technologies in Lasoju village in the rank order include limited capacity (WMS = 1.29), lack of training (WMS = 1.21), high cost of maintenance (WMS = 1.14), poor collaboration (WMS = 0.86), poor coordination (WMS = 1.00), high cost of technology (WMS = 0.86), inadequate access to technology (WMS = 0.86) and technical know-how (WMS = 0.57). Similarly, in Katsina State, factors such as limited availability, high initial costs, and labour intensity were identified as major constraints to the adoption of tomato postharvest technologies [6].

Table 5. Distribution of Respondents by Challenges faced in the Usage of NSPRI Postharvest Technologies

Challenges	VS	S	MS	NS	WMS	Rank
Technical know-how	3(7.1)	6(14.3)	3(7.1)	30(71.4)	0.57	8 th
Limited capacity	9(21.4)	3(7.1)	21(50.0)	9(21.4)	1.29	1 st
Poor collaboration	0(0.0)	9(21.4)	18(42.9)	15(35.7)	0.86	5 th
Poor coordination	0(0.0)	9(21.4)	24(57.1)	9(21.4)	1.00	4 th
High of cost technology	3(7.1)	9(21.4)	9(21.4)	21(50.0)	0.86	5 th
Inadequate access to technology	4(9.5)	8(19.1)	9(21.4)	21(50.0)	0.86	5 th
High cost of maintenance	0(0.0)	15(35.7)	18(42.9)	9(21.4)	1.14	3 rd
Lack of training	3(7.1)	12(28.6)	18(42.9)	9(21.4)	1.21	2 nd

VS = Very Severe (3), S = Severe (2), MS = Moderately Severe (1), NS = Not Severe (0)

Source: Survey, 2025

From the result of the current finding, it was observed that the effects of the challenges faced in the utilization of NSPRI postharvest Technologies in Lasoju village was below average (cut-off point = 1.50) indicating that the challenges were not significant to undermine the contribution of NSPRI postharvest technologies to overall development in vegetable handling in the study area. This finding reiterated the formidable contribution of NSPRI vegetable shed and vegetable basket in tackling and reducing postharvest losses in vegetable handling thereby boosting the income of various stakeholders in the vegetable value chain system.

Hypothesis of the study

Influence of selected Socio-economic characteristics on the level of usage of NSPRI postharvest Technologies

Table 6 showed the result of linear regression model showing the relationship between selected socio-economic characteristics and level of usage of NSPRI postharvest technologies in Lasoju community. It was revealed that educational level ($t = 2.728^{***}$) was significantly related with the level of usage of NSPRI postharvest technologies. The relationship was significant at 1% level indicating the fact that educational level is a strong determinant of technology utilization which may be connected with the fact that education brings reasonable exposure which often translates into high adoption rate of technologies. This is corroborated by [12], that the attainment of education is essential for the assessment of agricultural information intake or access by farmers. Conversely, other researchers [13] have also observed that literacy aids access to information and adoption (utilization).

Table 6. Relationship between selected Socio-Economic Characteristics and Level of Usage of NSPRI Postharvest Technologies

Variables	B-Value	Standard Error	T-value	P-Value
Constant	4.701	0.832	5.653	0.000
Household size	0.044	0.045	0.964	0.341
Educational Level	0.766	0.281	2.728***	0.010

$R = 0.407$; $R^2 = 0.166$; Adj. $R^2 = 0.123$; Standard Error of the Estimate = 1.388

*** Significant at 1% level

Source: Survey, 2025

CONCLUSIONS

Summary of Research Findings

It was established that 85.7 percent and 83.3 percent of the respondents used NSPRI vegetable shed and vegetable basket respectively on high level implying that postharvest technologies originating from NSPRI were highly utilized among the vegetable handlers in the study area.

Based on the findings of this study, the following are recommended:

1. Since NSPRI technologies are usually delivered to adopted village with no cost, it may not be able to address the issue of limited capacity. There is therefore need for donors to collaborate by providing funds in order to upscale those technologies in order to satisfy the needs of more beneficiaries.
2. NSPRI, government and organized private sectors should provide training programs for beneficiaries of their technologies to improve their technical know-how so as to improve the output thereby boosting their income level.

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**PROCENA NIVOA KORIŠĆENJA POSTŽETVENIH TEHNOLOGIJA
NIGERIJSKOG INSTITUTA ZA ISTRAŽIVANJE USKLADIŠTENIH
POLJOPRIVREDNIH PROIZVODA (NSPRI) IZMEĐU UZGAVJIVAČA
POVRĆA, LASOJA, DRŽAVA KVARA, NIGERIJA**

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Apstrakt: Cilj ovog istraživanja bio je da proceni nivo korišćenja postžetvenih tehnologija koje je razvila Nigerijska služba za razvoj i istraživanje postžetvenih inovacija (NSPRI) kod proizvođača povrća, mesto Lasoj, savezna država Kvara, Nigerija. Populaciju istraživanja činili su svi proizvođači povrća na području mesta Lasaju, dok je višestepenim postupkom uzorkovanja odabrano 42 ispitanika.

Primarni podaci prikupljeni su pomoću strukturisanog upitnika i vodiča za intervju. Prikupljeni podaci analizirani su deskriptivnim i inferencijalnim statističkim metodama.

Rezultati su pokazali da ispitanici imaju prosečnu starost od $52,62 \pm 10,98$ godina i prosečnu veličinu domaćinstva od $10,14 \pm 5,61$ članova. Većinu su činile žene (78,6%) bez formalnog obrazovanja (87,5%). Svi ispitanici (100%) su potvrdili dostupnost NSPRI načina čuvanja povrća pod nadstrešnicom, dok je samo 14,3% bilo upoznato sa drugom metodom NSPRI, korpom za povrće. Većina ispitanika izjavila je da u velikoj meri koristi NSPRI metodu nadstrešnice (85,7%) i korpu za povrće (83,3%). Kao glavni izazov u korišćenju NSPRI postžetvenih tehnologija, identifikovan je ograničeni kapacitet skladištenja povrća (ponderisani srednji skor = 1,29).

Rezultati linearne regresione analize pokazali su da je nivo obrazovanja ($t = 2,728^{***}$) imao značajan pozitivan uticaj na nivo korišćenja NSPRI postžetvenih tehnologija.

Obzirom na važnost obrazovanja kao ključnog faktora u usvajanju tehnologija, preporučuje se intenziviranje mera i programa koji podstiču sticanje kvalitetnog obrazovanja. To bi doprinelo efikasnijoj primeni postžetvenih tehnologija, većoj produktivnosti i boljem ekonomskom povraćaju ulaganja.

Ključne reči: NSPRI, postžetvene tehnologije, proizvođači povrća, usvajanje tehnologije, nivo obrazovanja, Nigerija.

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