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Influence of village adoption program: level of utilization of Nigerian Stored Products Research Institute (NSPRI) Postharvest Technologies among arable crop handlers in Alapa community, Kwara State, Nigeria

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ABSTRACT

To date, farmers seldom feel the impact of agricultural innovations either because they have no access to such vital information or because it is poorly disseminated. The study assessed the influence of village adoption program on the level of utilization of NSPRI postharvest Technologies among arable crop handlers in Alapa Community of Kwara State, Nigeria. The study was carried out in Alapa Community in Asa Local Government Area of Kwara State, Nigeria. The population of the study includes all the arable crop handlers in the study area. A multistage sampling procedure was employed to select 48 respondents for the study. The primary data were obtained with the aid of a well-structured questionnaire and structured interview guide. The data collected were analyzed using descriptive statistics and inferential statistics (Linear Regression model). Majority of the respondents were educated (87.5%) with a mean age and household's size of 38.31±10.743 years and 5.48±1.203 respectively. Similarly, majority of the respondents utilized NSPRI parabolic solar dryer (75.0%) and yam barn (47.9%) on high level. Lack of training (WMS = 2.10) was the major challenge faced in the utilization of NSPRI postharvest Technologies in Alapa community. The result of linear regression model revealed that educational level (t = 7.452***) was significantly related with the level of utilization of NSPRI postharvest technologies. Since educational level is an important determinant of technology utilization, 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

Adopted village concept is an extension model designed to disseminate new technologies to rural areas within 50 km radius from a research station to potential adopted villages or Technology Outreach Centres (TORCs) in order to objectively increase end users' productivity as well as a large scale adoption of modern production practices. Nigerian Stored Products Research Institute (NSPRI) is using the adopted village concept to strengthen the outreach system for promotion of postharvest technologies on its mandate commodities within Nigeria. There is always strategic links between the technologies

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and end users' adoption decision. NSPRI has been in the lead in its effort to undertake the mandate of reducing postharvest losses of agricultural products in order to guarantee sustainable food security. To this effect, postharvest technologies are developed in respect of the need of the end users while they are transferred through active outreach systems using different dissemination pathways. The Institute has developed and promoted postharvest technologies that had improved the livelihood and well-being of the end users. Meanwhile, the livelihood and well-being of farmers in Nigeria should be among the key considerations of policymakers in the country (Terdoo and Adekola, 2016; Ukamaka *et al.,* 2017). This is because of the proportion of the nation's populace that undertakes farming as a primary occupation and the role agriculture has been playing in the economy of the country since its inception (Balana*.,* 20218; Salami, 2021). Across most developing countries, agricultural development policies have shifted from a focus on boosting food production to environmental issues, poverty reduction, and a variety of livelihood enhancing initiatives (Souvik *et al.,* 2019).

Village adoption program is the key to demonstrate the benefits of agro technologies as a model for adoption for upliftment of rural economy (Papireddy *et al*., 2023). Village adoption is one of the best programs to show the advantages of improved practices through effective transfer of technology within the given period. With the concentrated efforts of farmers, scientists and line departments, all-round development of village is possible provided it is further replicated for ensuring sustainability of rural economy with the involvement of all the stakeholders.

However, since the establishment of the adopted village scheme in Alapa community in Kwara State, there has not been any empirical study into the level of utilization of NSPRI postharvest technologies among the beneficiaries. This study was therefore designed to provide empirical information on the level of utilization of NSPRI postharvest technologies among the beneficiaries in Alapa community in Kwara State.

2. Literature review

Village adoption program is the key to demonstrate the benefits of agro technologies as a model for adoption for upliftment of rural economy (Papireddy *et al*., 2023). Village adoption is one of the best programs to show the advantages of improved practices through effective transfer of technology within the given period. With the concentrated efforts of farmers, scientists and line departments, all-round development of village is possible provided it is further replicated for ensuring sustainability of rural economy with the involvement of all the stakeholders.

Adopted village concept is an extension model designed to disseminate new technologies to rural areas within 50 km radius from a research station to potential adopted villages or Technology Outreach Centres (TORCs) to objectively increase end users' productivity as well as a large-scale adoption of modern production practices.

3. Methodology

Study Area: The study was carried out in Alapa community, 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) (2006). Its coordinates are 8º37'0'N and 4º22'60'E in DMS (Degrees Minutes Seconds) or 8.61667 and 4.38333 (in decimal degrees).

Alapa stands as "a thriving agricultural hub" 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 Alapa are 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 arable crop handlers in the study area.

Sampling procedure and sample size: A multistage sampling procedure was employed to select 48 respondents for the study. The first stage involved purposive selection of Alapa community 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 Alapa community. The third stage involved the random selection of twelve (12) arable crop handlers from each of the selected cells in the community to give a total number of forty eighty (48) 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 utilization 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 utilization, otherwise low level of utilization (Author defined).

4. Results and Discussion

Socio-Economic Characteristics of the Respondents

Table 1 presents the socio-economic characteristics of the arable crop handlers in Alapa community. The results in Table 1 showed that 31.3 percent of the respondents were between 41- 50 years of age, 27.1 percent of the respondents were between 31-40 years of age, 22.9 percent of the respondents were within 30 years of age while 18.7 percent of the respondents were above 50 years of age. The mean age of the respondents stood at 38.31±10.743 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 line with the previous study of other scholars (Akomolafe *et al.*, 2023) who stated that individuals who are in active age group are highly productive in their undertakings.

The results in Table 1 showed that majority (60.4%) of the respondents were male while 39.6 percent of the respondents were female. This finding indicated that most of the processors in Alapa community were male. This is similar with the work of other authors (Ogunyinka and Oguntuase, 2020) in which male headed constituted 67% of their sample.

Table 1 indicated that 50.0 percent of the respondents had between 1-5 members in their households, 43.7 percent of the respondents had between 6-10 members in their households while only 6.3 percent of the respondents had above 10 members in their households. Moreover, the average member of the

households was found to be 5.48±1.203 indicating a large household size. This agrees with the views of Adeniyi *et al*. (2023) who reported that having large to medium household size is favorable as members would be used as source of labor thus reducing labor cost and increasing processing capacity of the household.

Table 1 showed the distribution of respondents by educational level. It was indicated that 12.5 percent of the respondents had no formal education. However, 45.8 percent of the respondents had primary school education, 25.0 percent of the respondents had secondary education, 2.1 percent of the respondents had tertiary school education while 14.6 percent of the respondents had non-formal education. The finding vividly connotes the fact that most of the respondents were educated which could go a long way in influencing the level of adoption of technology as related to cassava and yam handlings. This is in concordance with the report of other researchers (Eze, *et al*., 2019) that level of education increases productivity and capacity.

Table 1. Distribution of respondents by Socio-Economic Characteristics

Socio-Economic Characteristics	Frequency	Percentage
Age range (Years)		
≤30	11	22.9
31-40	13	27.1
41-50	15	31.3
Above 50	9	18.7
Mean	**38.31**	
S.D.	**10.743**	
Total	48	100.0
Sex of the Respondents		
Male	29	60.4
Female	19	39.6
Household size		
1-5	24	50.0
6-10	21	43.7
Above 10	3	6.3
Mean	5.48	
S.D.	1.203	
Educational level		
No formal education	6	12.5
Primary school	22	45.8
Secondary school	12	25.0
Tertiary school	1	2.1
Non-formal education	7	14.6

Source: Field Survey, 2025

Available NSPRI postharvest Technologies in Alapa community

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 parabolic solar dryer provided by NSPRI in their area while 75 percent of the respondents identified with the NSPRI yam barn in the study area. The finding therefore revealed that both parabolic solar dryer and yam barn provided by NSPRI are readily available for the use of processors in the study area.

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

NSPRI Technologies	Frequency	Percentage
Parabolic solar dryer	48	100.0
Yam barn	36	75.0

Source: Field Survey, 2025

Level of utilization of NSPRI postharvest Technologies in Alapa community

Table 3 presented the distribution of respondents by level of utilization of NSPRI postharvest technologies at Alapa community. The result in in the Table 3 indicated that parabolic solar dryer was the most widely utilized NSPRI postharvest technology in Alapa community with a weighted mean score (WMS) of 1.58 while the yam barn utilization closely followed parabolic solar dryer (WMS = 1.44). The high utilization score recorded by NSPRI postharvest technologies (parabolic solar dryer and yam barn) in the study area may be related with the unprecedented benefits derivable from their usage. Conversely, end users are more likely to make use of a given technology which seems to have relative advantage over the existing technologies.

Table 3. Distribution of respondents by Level of utilization of NSPRI postharvest Technologies in Alapa community

NSPRI Technologies	A	S	R	N	WMS	Rank
Parabolic solar dryer	9(18.8)	15(31.2)	19(39.6)	5(10.4)	1.58	1st
Yam barn	7(14.6)	13(27.1)	22(45.8)	6(12.5)	1.44	2nd

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

Source: Field Survey, 2025

Categorization of level of utilization of NSPRI postharvest Technologies in Alapa community

Table 4 presented the distribution of respondents by categorization of level of utilization of NSPRI postharvest Technologies in Alapa community. The result in Table 4 indicated that 75.0 percent of the respondents used NSPRI parabolic solar dryer on high level, about 8.3 percent of the respondents used NSPRI solar parabolic dryer on moderate level while 16.7 percent of the respondents used the parabolic solar dryer on a low level. Moreover, for the yam barn, 47.9 percent of the respondents used the technology on high level, about 31.3 percent of the respondents used NSPRI yam barn on moderate level while 20.8 percent of the respondents used the yam barn on low level. From the result of the

finding, it was observed that both technologies are used on high level indicating the fact that those technologies had been of help in reducing postharvest losses in the study area.

Table 4. Distribution of respondents by categorization of level of utilization of NSPRI postharvest Technologies in Alapa community

NSPRI Technologies	Categorization of level of use of NSPRI Technologies		
	High	Medium	Low
Parabolic solar dryer	36(75.0)	4(8.3)	8(16.7)
Yam barn	23(47.9)	15(31.3)	10(20.8)

Parabolic solar dryer: Mean = 3.02; SD = 1.295

Yam barn: Mean = 1.87; Standard Deviation = 2.174

Source: Field Survey, 2025

Challenges faced in the utilization of NSPRI postharvest Technologies

Table 5 presented the distribution of respondents by challenges faced in the utilization of NSPRI postharvest Technologies in Alapa community.

The challenges faced in the utilization of NSPRI postharvest Technologies in Alapa community in the rank order include lack of training (WMS = 2.10), limited capacity (WMS = 1.73), high cost of maintenance (WMS = 1.48), technical know-how (WMS = 1.42), inadequate access to technology (WMS = 1.15), high cost of technology (WMS = 1.10), poor coordination (WMS = 1.10) and poor collaboration (WMS = 1.08). From the result of the finding, it was observed that the effects of the challenges faced in the utilization of NSPRI postharvest Technologies in Alapa community was below average indicating that the challenges were not significant enough to undermine the contribution of NSPRI postharvest technologies to overall development in postharvest handling of agricultural produces in the study area. However, some of these challenges faced in the utilization of NSPRI postharvest Technologies in Alapa community create an avenue for discomfort countenance which can undermine the purpose of technology transfer.

Therefore, individuals with a high level of discomfort perceive new technology as complex and subsequently, this affects the level of the individual's technology acceptance and utilization. For instance, perceived lack of control had been identified as the reason why individuals with high discomfort traits often possess little confidence when it comes to using technology; henceforth consider using it as more difficult (Walczuch & Lemmink, 2019).

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

Challenges	VS	S	MS	NS	WMS	Rank
Technical know-how	15(31.2)	4(8.3)	15(31.2)	14(29.2)	1.42	4th
Limited capacity	10(20.8)	18(37.5)	17(35.4)	3(6.2)	1.73	2nd
Poor collaboration	1(2.1)	16(33.3)	17(35.4)	14(29.2)	1.08	8th
Poor coordination	2(4.2)	13(27.1)	21(43.8)	12(25.0)	1.10	6th
High of cost technology	3(6.2)	14(29.2)	16(33.3)	15(31.2)	1.10	6th

Challenges	VS	S	MS	NS	WMS	Rank
Inadequate access to technology	3(6.2)	14(29.2)	18(37.5)	13(27.1)	1.15	5th
High cost of maintenance	8(16.7)	13(27.1)	21(43.8)	6(12.5)	1.48	3rd
Lack of training	23(47.9)	8(16.7)	16(33.3)	1(2.1)	2.10	1st

VS = Very Severe (3); S = Severe (2); MS = Moderately Severe (1); NS = Not Severe (0)
Mean = 12.67; Standard Deviation = 5.952

Source: Field Survey, 2025

Hypothesis

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

Table 6 showed result of linear regression model showing the relationship between selected socio-economic characteristics and level of utilization of NSPRI postharvest technologies at Alapa community. It was revealed that educational level (t = 7.452***) was significantly related with the level of utilization of NSPRI postharvest technologies. The relationship was significant at 1% level indicating the fact educational level is a strong determinant of technology utilization. Notably, Quibria et al (2002) reasoned that higher education is especially important for achieving technology utilization.

Table 6. Relationship between selected Socio-economic characteristics and level of utilization of NSPRI postharvest Technologies

Variables	B-Value	Standard Error	t-value	p-value
Constant	3.396	0.750	4.526	0.000
Age	-0.010	0.023	-0.455	0.652
Household size	0.074	0.117	0.632	0.531
Educational Level	20.641	2.174	7.452***	0.000

R = 0.812; R2 = 0.790; Adj.R2 = 0.716; Std. Error of the Estimate = 1.286; F-statistics = 1.262
***Significant at 1% level

Source: Field Survey, 2025

5. Conclusions

It was concluded that Nigerian Stored Products Research Institute (NSPRI) village adoption program had facilitated high utilization of her postharvest technologies among arable crop handlers in Alapa community, Kwara State.

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

1. Since educational level was significantly related with the level of utilization of NSPRI postharvest technologies, there is therefore need for all stakeholders in rural development to gear up efforts to educate the respondents on importance of utilization of proven postharvest technologies in order to reduce postharvest losses thereby ensuring household food security.

2. Village adoption program significantly influenced the level of utilization of NSPRI' postharvest technologies, there is therefore need for all stakeholders in rural development to gear up efforts in implementing village adoption program in technology transfer to boost their utilization among the end users.

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