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ASSESSMENT OF EFFECTS OF UTILIZATION OF POST-HARVEST TECHNOLOGIES ON SOCIAL STATUS OF CEREAL CROP FARMERS IN BENUE STATE, NIGERIA

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Abstract
The study assessed effects of utilization of post-harvest technologies on social status of cereal crop farmers in Benue State, Nigeria. The population of the study consisted of all cereal crop farmers in Benue State. A multi-stage sampling procedure was used to select 215 respondents. Data for the study were collected using questionnaire and, interview schedule. Data for the study were analysed using both descriptive and inferential statistics. The findings revealed that 30.23 % of the respondents were within the age of 31- 40 years,67.44% were males, 75.35% were married, 61.40% acquired secondary education, 55.35% had household size of 6-10 persons, 54.88% belonged to cooperative society, 39.53% earned between ₦250,000 - ₦500,000 as annual income, 100% got their information from friends. Results on effects of utilization of post-harvest technologies on social status indicated that, the coefficient of storage (1.513849) and grading (.3125969) were significant at 1% level of probability, the coefficient of winnowing (1.77498) and sorting (.855591) were significant at 5% level of probability and the coefficient of fermentation (-.48133) was significant at 10% level of probability, respectively were the most effects of utilization of post- harvest technologies on social status of the respondents. Based on the findings of this research, the study concluded that, integration of post-harvest technologies into cereal farming has positively impacted the social status of farmers, enhancing their economic well-being, food security and community standing. The study recommended that farmers should be encouraged to adopt milling of rice as it adds more value to the products, increases its market prices as well as earns higher incomes and creates employment in rural areas.

Keywords: Assessment, utilization, effects Social status, Post-harvest, technologies.

1.0 Introduction

Cereals or grains belong to the monocot family of Poaceae or Gramineae and are cultivated widely to obtain the edible components of their seeds (Adam, 2022). Botanically, cereals are called Caryopsis and are structurally divided into endosperm, germ and bran. Cereal grains are cultivated in huge quantities and provide more food energy than any other type of crop; hence they are known as staple crops in Nigeria. From time immemorial, cereals have provided unlimited health benefits to mankind as a staple food in our diet. Cereals are rich in complex carbohydrates that provide man with ample energy and help to prevent cancer, constipation, colon disorders, high blood sugar and also enrich man's overall health with abundant proteins, fats, lipids, minerals, vitamins and enzymes (Adam, 2022).

Social status is the level of social value a person is considered to possess. More specifically, it refers to the relative level of respect, honour, assumed competence and difference accorded to people, group and organizations in a society (Mills, 2022). Social status is considered universally important because it influences how people think and behave. Based on widely shared beliefs about who members of a society think holds comparatively more or less social value, in other words, who they believe is better in terms of competence or moral traits (Sedikides and Guinote, 2018).

According to Sedikides and Guinote (2018), social status is determined by possession of various characteristics culturally believed to indicate superiority or inferiority (confident manner of speech or race). And as such, people use status hierarchies to allocate resources, leadership positions and other forms of power. In doing so, these shared cultural beliefs make unequal distributions of resources and power appears natural and fair, supporting systems of social stratification. Status hierarchies appear to be universal across human societies, affording valued benefits to those who occupy the higher rungs, such as better health, social approval, resources, influence and freedom. However, these all important attributes may be a mirage if cereal harvest is not quantified or if post-harvest losses are not minimised, especially among farmers. Minimising post-harvest losses can be achieved through the use of relevant post- harvest technologies.

Post-harvest technology is interdisciplinary science and technique applied to agricultural produce after harvest for conservation, processing, packaging, distribution, marketing and utilization to meet the food and nutritional requirements of people in relation to their needs (Mirza, 2014). Efficient technologies for harvesting, conveying/transportation, handling, storage, processing/preservation, packaging, marketing and utilization are components of the post-harvest value chain (Mirza, 2014). The role of post-harvest technologies in agricultural production cannot be over-emphasised, post-harvest technologies enhances agricultural production by reducing post-harvest losses to the nearest minimum, improve nutrition, add value to agricultural produce by opening new marketing opportunities, has potential to create rural industries, increasing land and labour productivity to enhance total production, generating new jobs and enhance other related economic sectors for viable economic growth (Mirza, 2014).

2.0 Objectives of the Study

The broad objective of the study was to assess effects of utilization of post-harvest technologies on social status of cereal crop farmers in Benue State, Nigeria. The specific objectives were to:

i. describe socio-economic characteristics of cereal crop farmers in the study area;

ii. determine effects of utilization of post-harvest technologies on the social status of the respondents:

3.0 Methodology

The study was carried out in Benue State, in the Middle-belt region of Nigeria and it is located between Longitudes 70 and 100 East of the Greenwich Meridian and Latitudes 60 25’ N and 80 8’ of the equator (Wikipedia, 2023). Benue State is named after River Benue and was formed from the former Benue-Plateau State in 1976, The State has a total land mass of about 33,955km square and human population of 4, 253, 64 (National Population Census, 2006) and 6,141,300 (population projection, 2022). It is divided into three geo-political zones: A North (Eastern zone) B (Northern Western zone) and C (Southern zone) with a total of 23 Local Government Areas (LGAs). It is bounded by Nasarawa State in the North, Taraba State in the East, Cross -River State in the South, Enugu State in the West, Kogi State in the South-west and Cameroon Republic in the South-east (Ani et al., 2014).

It is an agrarian State with a large percent of the populace who involves in agriculture hence its slogans, Food Basket of the Nations. It is blessed with rich fertile land and favourable climate condition suitable for wide range of crops and animals production. Rain season starts from April to November and Dry season lasting from December to March. Major crops cultivated in the State are yam, cassava, maize, rice, sorghum, millet, benniseed, pepper, soya beans, tomatoes and tree crops such as mangoes, cashew, oranges and pears. Livestock such as poultry, goats, sheep, pigs and cattles are also reared. Farming is dominated by the middle aged men who marry several wives to cultivation of large farmland (Okwu and Daudu, 2011).

Major tribes in the State are Tiv, Idoma, Igede and Etulo. The land is generally low lying (average 100m-250m) and gently undulating with occasional inselbergs, knoll,laterite among others. It is only at the boundary area with Cameroon, Kwande and

Oju Local Government Areas that have hilly terrain. Here, the terrain is characterised by steep slopes, deep incised valleys and generally rugged relief (Wikipedia, 2023).

The population of this study comprises all registered cereal crop farmers in Benue State, Nigeria. The sample size for the study was selected using a multi-stage sampling procedure viz a stratified, purposeful and simple random sampling techniques. In the first stage, the State was stratified into three already existing agricultural zones: North-Eastern, North-Western and South-Western zones, respectively. In the second stage, two LGAs were purposively selected from each of the agricultural zones such as: North-Eastern agricultural zone- Ushongo and Katsina- Ala, North-Western zone Markurdi and Buruku and South-Western zone Oju and Okpowu due to high asses of post- harvest losses giving total of six LGAs. In the third stage, two rural communities were purposively selected from each of the six LGAs due to their dominant use of post-harvest technologies. Finally, a sampling frame was developed for each of the LGAs and across board proportions a total sample size of 215 respondents for the study was selected. Data for this study were collected from primary source through the use of well-structured questionnaire.

Data for the study were analysed using both descriptive and inferential statistics. Descriptive statistics such a frequency, percentage and mean were used as well as Logit regression analysis were used to analyse data for this study

Model Specification

The data X_1, X_2 …Xn were independently distributed. It assumes binomial distribution of the response. The dependent variable does not need an exponential family.

The model is mathematically expressed as

$$P_i = \frac{1}{1 + e^{-(\beta_o + \beta_1 x_{i1} + \dots + \beta_k x_{ik})}}$$

Where,

P_i = probability of participation (high=1 and otherwise = 0)

β_o = constant term

β_i= (i=1, 2……9) = parameters to be estimated

X_i = (i=1, 2……9) = independent variables

The model is explicitly expressed as

$$Z_i = \beta_o + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + U_i$$

Where

Z = Probability that shows effects of utilization of post-harvest technologies on social status of cereal farmers and it ranges from 0-1 (1= Status, 0=No status)

X_i = Winnowing

X_2=Drying

X_3 = Storage

X_4 =Threshing

X_5 =Separation

X_6 = Sorting

X_7 = Milling

X_8= Cleaning

X_9 =Grading

X_{10}= Parboiling

X_{11}= Fermentation

U_i = error term

4.0 Results and Discussion

4.1 Socio-economic Characteristics of the Respondents

Age (years)

Table 1 indicated that 30.23 % of the respondents were within the age of 21-30 years and 22.79% were aged 41-50 years. The mean age was 38 years. This implies that, farming in the study area was dominated by young people, who are active in the utilization of post-harvest technologies. This finding is similar to that of Nathan *et al* (2015) who stated that, the respondents were in their active age and this has a positive bearing on the effective utilization of post-harvest technologies.

Sex

Majority (67.44%) of the respondents were males and 32.56% were females. This implies that males were more involved in farming in the study area because of the typical role they play like land preparation, equipment operation and decision making. This agrees with Gwarry *et al.* (2013) who stated that the farming occupation in the rural is dominated by males.

Marital status

Table 1 further shows that, majority (75.35%) of the respondents were married and 13.49% were widowed. Married people in the society are perceived as more responsible people that share farming responsibilities and decisions as well communicate regularly about farm operations. This finding agrees with Oladoja *et al.* (2008) who stated that marriage confers some level of responsibility and commitment on individuals.

Level of education

Table 1 also shows that, majority (61.40%) of the respondents had secondary education and 19.53% had tertiary education. It is widely believed that education creates a favourable mental attitude for the acceptance of new ideas and practices, enabling a farmer to seek for and utilize useful information from print and electronic media, thereby accelerating the rate of use of technologies so as to reduce post-harvest losses. Consequently the people in the study are likely to be amenable in accepting innovations. Most farmers in the study area had one form of education or another. This could be an added advantage for the respondents to quickly understand and adopt innovations on post-harvest technologies. The finding is in tandem with Akinbili and Ndagbu (2000) who stated that education has an important implication particularly for the adoption of new technologies. This finding is similar with Bidemi and Clement (2017) who stated that education assists farmers in better understanding of technologies emerging issues.

Household size

Table 1 also reveals that, a higher proportion (55.35%) of the respondents had 6-10 persons, with the average household size of 10 persons. This is an indication that there are many people in a household. This implies that there may be many people available to assist in carrying out farm activities to reduce post-harvest losses. The finding agrees with Adamu and Bakari (2015) who stated that large family size could be viewed as an added advantage in terms of family labour supply and thus production may be enhanced. This finding also agrees with Bolarinwa and Oyeyinja (2011) who reported that respondents had a household size of between 6 -10 persons.

Membership of cooperative society

Table 1 showed that majority (54.88%) of the respondents belonged to cooperative societies and 45.12% were not members of cooperative societies. Membership of cooperative society affords the farmers opportunity of sharing information with other farmers on ways of managing post-harvest losses. This finding agrees with that of Onuekwusi and Atasie (2011) that most of the farmers belonged to cooperative societies which are expected to disseminate information to farmers on the importance of agricultural technologies.

Average annual income

Table 1 shows that, a small 39.53% of the respondents earned between ₦ 250,000 and ₦500,000 on cereal sales per annum. The mean income of cereal production was ₦ 610,600.00 in the study area. This implies that cereal production could be a very lucrative business if well handled. This is consistent with Odoemenem and Otanwa (2011) who reported that the annual income of most rural farmers in Nigeria is very small and this affects their ability to acquire improved technologies to reduce post-harvest losses.

Table 1: Socio-economics Characteristics of the Respondents (n=215)

Variables	Frequency	Percentage	Mean
Age (Years)			38.09
21-30	65	30.23	
41-50	49	22.79	
51-60	25	11.63	
> 60	5	2.33	
= 20	1	0.47	
Sex			
Male	145	67.44	
Female	70	32.56	
Marital Status			
Married	162	75.35	
Widow/Widower	29	13.49	
Single	15	6.98	
Divorced	9	4.19	
Level of education			
Secondary	132	61.40	
Tertiary	42	19.53	
Primary	37	17.67	
Post graduate	3	1.40	
Non-formal	1	0.47	
Household Size			10.06

able 1 Contd.

Variables	Frequency	Percentage	Mean
6-10	119	55.35	
11-15	55	25.58	
= 5	22	10.23	
16-20	11	5.12	
>20	8	3.72	
Farm Size (ha)			3.665
= 3	120	55.81	
3.1-5.0	66	30.70	
5.1-7.0	18	8.37	
>7.0	11	5.12	
Cooperative society			
No	118	54.88	
Yes	97	45.12	
Annual income (N)			610,600.00
250,000-500,000	85	39.53	
= 250,000	84	39.07	
500,000-750,000	23	10.70	
750,000-1,000,000	17	7.91	
>1,000,000	6	2.79	

4.2 Effects of Utilization of Post-harvest Technologies on Social Status.

Table 2 indicated effects of utilization of post-harvest technologies on social status. The chi-square statistics (X^2) value of the regression model is 96.47 and significant at 1%. This implies that logit regression model is fit to explain the effect of post-harvest technologies on social status. The result also shows that Pseudo R^2 for regression is 0.3873 indicating that the variables tested accounted for only 38.7% of the variation of the dependent variable. The remaining 61.3 is attributed to the error term.

Results of coefficient of storage .009 (1.513849) had positive and significant effect on social status at 1%, suggesting that a percentage increase proper storage of grains helps maintain grains quality, reducing spoilage and losses. The implication is that by maintaining quality and reducing losses, farmers can increase their income thereby increasing their social status.

Results of coefficient of grading .000 (.3125969) had positive and significant effect at 1%, suggesting that a percentage increase in grading grains according to quality standards can increase their market value as well improved farmers social status. This tandem with the finding of Kader (2023) stated that combined grading and storage reduces the risk of spoilage and maximizes storage efficiency thereby enhanced food security.

Results of coefficient of winnowing .016 (1.77498) had positive and significant effect at 5%, implies that increase in percentage of winnowing would separates grains from chaff, reducing impurities and contaminants to enhances food security as well an essential step in post-harvest handling, contributing to better grain quality and increased market value.

Results of coefficient of sorting .038 (.855591) had positive and significant effect at 5%, implies that increase in percentage of sorting separates grains by quality, size and ripeness to ensure uniformity and meet market standards. The implication is that sorting help reduce grain losses and improve overall efficiency and increase their profits thereby enhancing farmers' social status. This confirms with the finding of Agada and Ijih (2019) that removing impurities and contaminants, contribute to safer food security that enhanced the social status of farmers.

Results of coefficient of fermentation .129 (-.48133) had negative and significant effect at 10%, utilization of post-harvest technologies on social status. This implies that farmers in the study area often utilizes fermentation but increase in percentage utilization of grains such as sorghum for the production of burukutuu and maize for the production of pap will increase market value and increase their income thereby enhancing their social status

Table2: Effects of Utilization of Post-harvest Technologies on Social Status (n=215)

Variables	Coefficient	SD	Z	P>(Z)	95%	Conf. interval
					Upper	Lower
Winnowing	1.77498**	.7349461	2.42	0.016	.3344822	3.215414
Drying	.1969016	.6616005	0.30	0.766	-1099812	1.493615
Storage	1.513849***	.58207725	2.60	0.009	.3730075	2.65469
Threshing	.4166321	.5098541	0.82	0.414	-5826635	1.415928
Separation	.4273246	.7174334	0.60	0.551	-9788189	1.833468
Sorting	.855591**	.4125688	2.07	0.038	.046971	1.664211
Milling	.0504178	.4324364	0.12	0.907	-7971421	.8979776
Cleaning	.0222894	.5296229	0.04	0.966	-1.015752	1.060331
Grading	.3125969***	.4954068	4.15	0.000	1.0286	2.872666
Parboiling	.3125969	.4954068	0.63	0.528	-.6583826	1.283576
Fermentation	-.48133*	.3169175	-1.52	0.129	-1.102477	.1398169
Constant	-18.52619	4.435033	-4.18	0.000	-27.2187	-9.833689

x^2=test 96.47

Loglikelihood-76.301699

Prob> =0.000

Pseudo R2 =0.3873

Significant at *** =1%, **=5% and * =10%

5.0 Conclusion and Recommendations

5.1 Conclusion

The study concluded that effects of utilization of post-harvest technologies on social status indicated that chi-square value of 96.47 was statistically significant at all levels of significance also the integration of post-harvest technologies into cereal farming has positively impacted the social status of farmers, enhancing their economic well-being, food security and community standing

5.2 Recommendations

Based on the findings of this study, the following recommendations were made:

1. Farmers' education and training programs should be strengthened, focusing on practical skills and technology adoption, educating farmers on the benefits and use of post-harvest technologies.
2. Farmers should be encouraged to adopt milling of rice as it adds value to their produce, increases its market prices as well as earns higher incomes and creates employment opportunities in rural areas.

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