

## **ACCESS TO EXTENSION SERVICES IN TOMATO PRODUCTION AMONG FARMERS IN OGUN STATE, NIGERIA**

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### **ABSTRACT**

*This study examined the relationship between access to agricultural extension services and reductions in post-harvest losses in tomato production among farmers in Ogun State, Nigeria. Specifically, it assessed farmers' access to extension services, identified perceived challenges and barriers to access, and compared the quantity of post-harvest tomato losses between farmers with and without access to extension services during the most recent production season. Primary data were collected from 95 respondents using structured questionnaires and focus group discussions. A multistage sampling technique involving purposive and simple random sampling was employed. Data were analyzed using descriptive statistics and inferential tools, including a t-test. The results indicate that access to extension services influenced the reduction of post-harvest losses among farmers with access. Male farmers dominated tomato production (63.3%), while 36.8% were female. Most respondents (41.1%) were aged 31-50 years, and 57.9% had at least 11 years of farming experience. Educational attainment was generally low, with 36.8% having primary education as the highest level achieved. Although respondents were aware of extension services and their benefits, participation in post-harvest management training was limited. Pest and disease infestation emerged as the major contributors to post-harvest tomato losses in the study area. The study underscores the need to strengthen extension service delivery, particularly in post-harvest handling and management, to enhance tomato productivity and reduce losses.*

**Keywords:** Agricultural extension services; post-harvest losses; Tomato production; Farmers; Ogun State; Nigeria

## INTRODUCTION

Tomato (*Solanum lycopersicum*) is one of the most widely cultivated and consumed vegetables in Nigeria, contributing significantly to household nutrition, income generation, and employment, particularly among smallholder farmers (FAOSTAT, 2022; Ajenifujah-Solebo et al., 2025). Despite its high demand, tomato production is characterized by substantial post-harvest losses, often estimated at 40–50% of the total yield (FAO, 2021; Yami et al., 2025). These losses are attributed to several factors, including poor handling practices, inadequate storage infrastructure, and limited market access (Arah et al., 2015). The perishable nature of tomatoes, coupled with infrastructural and knowledge gaps among producers, exacerbates food insecurity and economic vulnerability in farming communities.

One of the critical pathways to reducing post-harvest losses is the provision of agricultural extension services. Extension services play a vital role in disseminating knowledge, introducing improved technologies, and building farmers' capacity for effective post-harvest management (Davis & Sulaiman, 2014). These services can offer practical guidance on handling, processing, preservation, packaging, and transportation techniques to prolong shelf life and maintain the quality of produce. However, in many parts of Nigeria, including Ogun State, access to extension services remains uneven, and the degree to which such access influences post-harvest outcomes is underexplored.

While tomato production continues to expand in Ogun State, the gains from increased output are undermined by high post-harvest losses. Farmers often lack the technical know-how and support systems necessary to manage harvested produce effectively. Despite government and donor-led investments in agricultural extension systems, the actual impact of these services on post-harvest loss reduction has not been adequately quantified or contextualized at the sub-national level (Adesiyan et al., 2021). This knowledge gap limits evidence-based decision-making and policy interventions to improve value chain efficiency and reduce waste.

Reducing post-harvest losses is critical for enhancing food security, increasing farm incomes, and promoting sustainable agricultural development, as it boosts food availability, improves smallholder farmers' economic returns, and helps achieve broader socio-economic and environmental goals (Food Forward NDCs, 2024). Understanding the role of extension services in this context is timely and crucial, particularly as Nigeria continues to grapple with food system challenges. This study provides a localized assessment of the influence of access to extension services on post-harvest management among tomato producers in Ogun State. By examining this linkage, the research will contribute to better-targeted extension policies and programs that can enhance agricultural productivity and minimize waste.

Although existing studies have examined post-harvest losses in agricultural production (Kitinoja, 2013; Yusuf et al., 2020), limited empirical evidence exists on how access to extension services influences the magnitude of these losses at the local level. By adopting a micro-level approach and utilizing farmer-level data, this study provides new empirical insights into the role and effectiveness of agricultural extension services in mitigating post-harvest losses in tomato production. The findings are expected to contribute to improved extension service delivery strategies and to support evidence-based agricultural policy formulation in Nigeria and other developing countries experiencing similar post-harvest challenges.

## **METHODOLOGY**

### **The Study Area**

The study was conducted in Ijebu North and Odeda Local Government Areas (LGAs) of Ogun State, Nigeria, located in the south-western geopolitical zone of the country. Ogun State lies between latitudes 6°54'N and longitudes 3°15'E and falls within the humid tropical climatic zone, characterized by seasonal rainfall, high relative humidity, and elevated temperatures, all of which are suitable for crop production. The state covers approximately 16,980 km<sup>2</sup>, of which about 60–65% is arable land, and had a population of 3,751,140 according to the 2006 national census (Aminu et al., 2015). Several LGAs in the state are recognized for vegetable production, particularly tomatoes.

Ijebu North LGA, headquartered in Ijebu-Igbo, and Odeda LGA, with its administrative centre in Odeda town, are predominantly agrarian areas where agriculture constitutes the primary livelihood. Major crops cultivated include tomatoes, cassava, maize, yams, vegetables, cocoa, oil palm, and rice. Tomato varieties such as Roma, plum, and cherry tomatoes perform well in these areas due to favourable agro-ecological conditions. The presence of active local markets and widespread engagement in tomato farming makes the selected LGAs appropriate for assessing access to extension services and post-harvest loss dynamics.



The map of Ogun State showing the Local Government Areas (The study areas are being magnified). The state has twenty Local Government Areas, of which five (5) are renowned for tomato production.

### Sample Size

The Taro Yamane sample size formula was used to determine the appropriate sample size for the study population. The formula is as follows:

$$n = N / 1 + N * (e)^2$$

Where:

- n is the desired sample size
- N is the population size
- e is the desired level of precision

Therefore, to calculate the sample size,

$$n = 100 / 1 + 100 * (0.05)^2$$

$$n = 100 / 101(0.0025)$$

### Sampling techniques and procedures

Multistage sampling was employed to select tomato farmers for participation in this study, to ensure a representative sample of the population in this study area. The First stage involved the purposive sampling of three (3) of the five (5) LGAs known for tomato production. The three local governments selected were Ijebu North, Odeda, and Abeokuta North.

The second stage involved the simple random sampling of tomato farmers (selected proportionally to size from each LG area). Ninety-Five (95) tomato farmers were randomly selected from Ijebu North, Odeda, Abeokuta North, LGA, Ogun State, Nigeria.

**Table 1. Distribution of Questionnaires Administered and Responses Obtained**

LGA	Status	Towns	No. of Questionnaires Administered	No. of Responses Obtained
Ijebu North	Tomato Farmers and Marketers	Mamu, Ago-Iwoye	40	40
Abeokuta North	Tomato Farmers	Itoko Village, Ijagunna	30	30
Odeda	Tomato Farmers and Marketers	Otere Ogunkola, Otere Ojebiyi	30	25

### Data collection methods

Primary data were used for this study and were obtained using structured questionnaire administration, focus group discussion, and observation method. The questionnaire was developed in line with the study's objective. Data were collected from tomato farmers in Ijebu North, Odeda, and Abeokuta North using a sampling frame designed to capture information on post-harvest losses and access to extension services.

### **Survey instrument designs**

A structured questionnaire was designed as the primary data collection instrument. It comprised sections on respondents' socio-demographic characteristics, knowledge of post-harvest practices, and awareness of extension services related to tomato production. Socio-demographic variables included age, sex, income, farming experience, and educational level. The knowledge and awareness sections assessed respondents' familiarity with post-harvest handling practices and their awareness of extension-related information.

Farmers' attitudes toward access to extension services and the effectiveness of post-harvest management practices were measured using a five-point Likert scale ranging from "strongly agree" to "strongly disagree." The attitude assessment captured respondents' confidence in extension services, perceived benefits of adopting recommended post-harvest practices, and satisfaction with extension support. In addition, information on the types of post-harvest management practices adopted by tomato farmers and the constraints encountered in mitigating post-harvest losses was documented.

### **Method of Data Analysis**

The study employed descriptive and inferential statistics to analyze data collected from respondents. For the analysis, Statistical Package for Social Sciences (SPSS) was utilized to analyze data obtained from the respondents. Descriptive Statistical tools such as mean, percentage, and frequency distributions were used for analysis.

## **RESULTS AND DISCUSSION**

The results in Table 2 show male dominance (63.3%) in tomato production, indicating that tomato farming in Ogun State remains largely male-driven. This aligns with previous findings that agricultural production in southwestern Nigeria is often male-dominated due to land ownership patterns and cultural roles (Adesiyan et al., 2021). Most farmers (82.2%) fall within the economically active age bracket (31–50 years), suggesting strong labor capacity and productivity potential. Similar observations were reported by Yusuf et al. (2020), who found that middle-aged farmers dominate tomato production in Oyo State. The study also shows that 40 of the respondents were between age 31-40 years of Age participate in tomatoes farming with a percentage rate of 41.1% and 40 tomatoes farmers between 41-50 also participate at the rate of 41.1%, and 15 tomatoes farmers between 51-60, participate in tomatoes farming at the rate of 17.8% in this study area. This result shows that farmers between the ages of 31-50 participate actively in tomato farming, and farmers between the ages of 51-60 have

Education results show that 73.7% of respondents had at least primary education, indicating a moderate literacy level, which enhances receptiveness to extension information and the adoption of innovations (Davis & Sulaiman, 2014). Farming experience was relatively high, with 73.7% having more than 11 years of experience, indicating strong practical knowledge in tomato cultivation. This supports Kitinoja (2013), who emphasized that experienced farmers better understand the challenges of post-harvest management.

Table 2. Frequency distribution for Socio-economics Characteristics

Variable	Category	Frequency	Percentage (%)
Sex	Male	60	63.3
	Female	35	36.8
Age (years)	31–40	40	41.1
	41–50	40	41.1
	51–60	15	17.8
Education level	No formal education	25	26.3
	Primary education	35	36.8
	Secondary education	20	21.1
	Tertiary education	15	15.8
Farming experience (years)	5–10	25	26.4
	11–15	55	57.9
	16–20	10	10.5
	21–25	5	5.3

Table 3. Frequency distribution for respondents Access to Extension services.

Variable	Category	Frequency	Percentage (%)
Awareness of extension services	Yes	95	100
	No	0	0
Received extension services on tomato farming	Yes	45	47.4
	No	50	52.6
Interaction frequency	Weekly	35	36.8
	Monthly	55	57.9
	Rarely	5	5.3
Training on post-harvest management	Yes	15	15.8
	No	80	84.2
Storage & preservation information	Yes	20	21.1
	No	75	78.9
Pest & disease management	Yes	46	47.4
	No	50	52.6
Market information	Yes	15	15.8
	No	80	84.2
Satisfaction with extension services	Very satisfied	45	47.4
	Satisfied	40	42.1
	Very dissatisfied	10	10.5
Experienced post-harvest losses	Yes	75	78.9
	No	20	21.1

All respondents (100%) were aware of extension services, as shown in Table 3, indicating a strong institutional presence in the study area. However, only 47.4% had actually received tomato-related extension services, revealing a gap between awareness and service delivery. Training on post-harvest management was very low (15.8%), indicating inadequate emphasis on this topic. This supports FAO (2021), which reported an insufficient focus on post-harvest extension in Nigeria. Monthly interaction (57.9%) was the most common, indicating irregular engagement that may limit knowledge retention and adoption. Davis and Sulaiman (2014) emphasized that frequent contact increases adoption of improved practices. High post-harvest loss incidence (78.9%) confirms the severity of the problem, consistent with Arah et al. (2015), who estimated tomato losses in Africa at 40–50%.

Table 4 indicates that there is greater variability in respondents' ratings or experiences who have received extension services than in those who have not. This means there was no significant difference between the losses of those who had an impact with extension services and those who didn't have an impact of extension services. Although farmers who received extension services recorded slightly lower losses (mean = 4.71) compared to non-beneficiaries (mean = 3.75), the difference was not statistically significant ( $p > 0.05$ ). This suggests that while extension services show positive influence, their intensity and coverage are insufficient to produce a significant impact. Similar findings were reported by Yusuf et al. (2020), who observed that extension benefits depend heavily on training quality and frequency.

Table 4: Independent Sample t-Test on Post-Harvest Losses

<b>Group</b>	<b>N</b>	<b>Mean</b>	<b>Std. Dev.</b>
Received extension services	45	4.71	1.45
Did not receive services	50	3.75	1.76

t-test:  $t = 1.736$ ,  $df = 93$ ,  $p = 0.086$

Results from Table 5 show the challenges that tomato farmers encounter when attempting to receive extension services. The result revealed that 36.8% of the tomatoes farmers strongly agree that they encounter financial barriers that prevent them for accessing extension services while 10.5% strongly disagreement that they don't not encounter financial barriers that parent them from accessing extension services. Also, 47.4% strongly agree that insufficient infrastructure is a major barrier for tomato farmers to access extension services; 5.3% of tomato farmers strongly disagree that insufficient infrastructure is a major barrier to accessing extension services. Furthermore, 57.9% of tomato farmers agree that there is a limited availability of extension services specifically tailored to tomato farmers' needs, while 5.3% strongly disagree on the limited availability of extension services tailored specifically to the needs of tomato farmers. This reveals that Tomato farmers face various challenges trying to access extension services.

Major constraints included poor infrastructure (84.2%) and limited tailored services (94.7%). These barriers restrict extension outreach, consistent with Davis & Sulaiman (2014), who identified infrastructure as a major constraint in rural advisory systems. Financial limitations also affected access, echoing FAO (2021), which reported cost as a major barrier to extension participation in developing countries.

Table 5. Frequency distribution for perceived challenges

<b>Statement</b>	<b>SA (%)</b>	<b>A (%)</b>	<b>D (%)</b>	<b>SD (%)</b>
Limited availability of extension agents	36.8	15.8	36.8	10.5
Financial barriers	36.8	31.6	15.8	15.8
Poor infrastructure	47.4	36.8	10.5	5.3
Inadequate government support	47.4	47.4	0	5.3
Limited tailored services	36.8	57.9	0	5.3
Geographic isolation	47.4	42.1	5.3	5.3

Results from Table 6 show that 52.6% strongly agree that tomato farmers who actively engage with extension services demonstrate a higher level of productivity compared to those who do not. Also, 63.2% strongly agree that Extension services play a crucial role in enhancing the efficiency of post-harvest practices, leading to increased productivity among tomato growers. 63.2% strongly agree that extension services have played a crucial role in enhancing my understanding of pest and disease management in tomato production. Over 90% of respondents agreed that extension services improved productivity and reduced losses. This confirms Arah et al. (2015), who emphasized training in pest management and storage as critical for loss reduction. High adoption of innovations (89.5%) reflects strong trust in extension systems, similar to findings by Kitinjoja (2013), who reported improved outcomes following extension training.

Table 6. Frequency distribution on respondents perceived impact of extension education on tomato productivity.

<b>Statement</b>	<b>SA (%)</b>	<b>A (%)</b>
Extension improves productivity	47.4	52.6
Reduces post-harvest losses	57.9	42.1
Improves profitability	57.9	42.1
Enhances post-harvest efficiency	63.2	36.8
Information relevance	52.6	47.4
Addresses specific challenges	78.9	21.1
Adoption of new practices	89.5	10.5
Pest & disease knowledge	63.2	36.8
Introduces innovations	52.6	47.4

## CONCLUSION

The findings indicate that although awareness of agricultural extension services among tomato farmers in Ogun State is high, limited access to specialized post-harvest training and irregular extension contact have constrained their effectiveness in significantly reducing post-harvest losses. Policy efforts should therefore prioritize strengthening extension systems through increased investment in post-harvest-focused training, improved rural infrastructure, and the delivery of tailored, crop-specific advisory services to achieve measurable reductions in losses and enhance smallholder livelihoods.

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