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POSTHARVEST FARM PRODUCE HANDLING IN NIGERIA AND ITS IMPLICATION

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ABSTRACT

Poor handling of agricultural products in Nigeria leads to post-harvest losses that hamper food security, farmers' livelihoods and economic growth and development. This study evaluates the trends associated with post-harvest losses in crops (maize, cowpea, cassava and tomato) and livestock products (cattle, milk, layers and broilers) in Nigeria from 2022 to 2024. The information was collected from the National Agricultural Extension and Research Liaison Services (NAERLS) reports of the Annual Agricultural Performance Survey (APS). The data collected were subjected to Chi-Square and ANOVA analysis. The results obtained revealed that post-harvest losses are quite high varying from 15% to over 40%. Poor road networks, poor electricity supply, inadequate storage facilities, and security concerns are some of the leading factors responsible for the losses. Some improvements were recorded for cassava, cowpea, and tomato crops, especially with the decline in cassava losses at an estimated average rate of 5.5% per year. The economic evaluation indicated that these losses had a significant impact, as farmers earned more income of up to ₦105,000 per hectare in tomatoes and ₦85,800 in cassava each year. However, consistent insecurity, low adoption of modern technologies, high price of inputs and processing equipment hinders this impact. This study recommends that specific measures be taken to address the menace faced by each commodity (storage facilities and processing equipment). There is also the need for improving the rural infrastructure and establishing a system to record and monitor for post-harvest loss in Nigeria.

Keywords: Post-harvest losses, Crop products, Livestock products, Handling

1.0 INTRODUCTION

The poor handling of agricultural products in Nigeria, which is characterized by inadequate storage, poor-quality packaging and high post-harvest losses, significantly affects the economy by reducing potential export revenue. This hinders industrial development due to scarcity of raw material, increase the cost of food importation, prevent food self-sufficiency and also the overall economic growth. Addressing these issues through improved handling, storage, processing, and market access is important for boosting productivity, creating jobs, achieving greater food security and economic stability. In Nigeria, 90% of wastage occurs from food loss within the value chain (Ogundele, 2022). This directly affects production through income loss and poor consumption, which in turn reduces food availability, increases prices, and decreases nutritional content (Rockefeller Foundation, 2015). Food crops account for the primary source of food loss in developing countries. Both food crops (e.g., grains, fruits, vegetables, tubers, pulses) and dairy account for 92% of developing world losses, with the remaining 8% occurring in meat (4%) and fish (4%) (Rockefeller Foundation, 2015). Meat and fish are a small part of overall food loss and are comparable to other crops as a percentage of production in their category (Ogundele, 2022).

The growing population necessitates more food, leading to an increased demand for food production (UNICEF, 2021). A larger population means more mouths to feed, which naturally leads to an increased demand for food. This demand can put pressure on resources like land and water, and can lead to challenges in producing enough food for everyone. According to the FAO (Food and Agriculture Organization), to meet the food needs of the global population by 2050, the annual production of crops and livestock is expected to increase by 60% when compared to the current levels (Muhie, 2022). To meet this rising demand, various strategies are being implemented, including expanding cultivation areas, improving productivity per unit area, developing enhanced crop varieties, optimizing the use of agricultural inputs, and refining agricultural practices such as precision farming, pest and disease control, irrigation, nutrition, and pruning (Anastasiou et al. 2023). However, one aspect that has often been overlooked is the reduction of losses, referred to as "silent harvesting" by researchers, which is the unnoticed food loss occurring at various stages of the supply chain, from production to consumption. Reducing these losses is essential for enhancing food security and sustainability (Ishangulyyev et al. 2019). Agricultural produce handling includes harvesting, storage/preservation, transportation, processing/value addition, and marketing. Nigeria faces significant challenges in these areas, leading to high post-harvest losses (15-40%), depending on the crop and geographical locations (FAO, 2022; 2023). Food loss is a major issue that requires a thorough approach to effectively address it. It significantly affects the environment and depletes natural resources, putting additional pressure on the planet. To combat this problem, a comprehensive strategy is essential for effective solutions (Urugo et al. 2024).

Despite efforts to improve agricultural yields, inadequate harvesting and post-harvest practices lead to significant product losses and waste, threatening the profitability of increased production (Ogedengbe et al. 2022). This situation negatively influences the financial aspects of agriculture, contributes to food insecurity, and causes environmental degradation. These losses are particularly challenging for developing countries, where a large portion of agricultural products becomes unusable despite significant investments in resources (Ali et al. 2021). Minimizing losses in agricultural products is more crucial and cost-effective than merely increasing production, as it enhances resource utilization and economic efficiency (Kumar and Kalita 2017). Preventing losses conserves vital resources like water, land, and energy, improving the overall efficiency of the agricultural system (Perdana et al. 2023). This approach not only helps in ensuring food security but also contributes to sustainable agricultural practices (Jarman et al. 2023). High food losses greatly affect food security, emphasizing the need to prioritize loss reduction rather than just increasing production. Strategies to reduce losses include improving post-harvest handling, storage, transportation practices, enhancing market access, and optimizing distribution channels (Nath et al. 2024). Increasing public awareness about the causes of agricultural losses and how to mitigate them is a crucial initial step. Understanding the factors behind agricultural produce losses is essential for managing and mitigating them effectively. Comprehensive research and data-driven approaches are necessary to develop sustainable and efficient agricultural systems and to ensure that food reaches those in need, thereby contributing to a secure and sustainable food system for everyone (Shahbazi 2021; Shahbazi et al. 2025). Farmers and stakeholders have, however, argued that provision of storage facilities alone may not be enough to completely tackle the problems of post-harvest losses in Nigeria. This paper therefore considers critical assessment of the causes and extent of post-harvest loss in Nigeria as well as efforts being made to reduce losses. It also attempts to draw lessons of experience from other countries through the review of literatures on options for minimizing post-harvest loss.

1.1 **Post-Harvest Loss Trends (2022–2024)**

Post-harvest loss is a multifaceted and significant challenge to food security and agricultural sustainability, particularly in developing regions where infrastructural shortcomings and technological deficits are prevalent (FAO, 2019). These losses can occur at various stages within the agricultural value chain, ranging from the critical moments of harvesting and handling to the subsequent phases of storage, transportation, and processing. In sub-Saharan Africa, alarming rates of post-harvest losses for staple crops and livestock products can be as high as between 20%-40%, significantly impacting food availability, diminishing farmers' income, and hampering national economic progress (Affognon *et al*., 2015). By meticulously monitoring the trends of these losses over time, it becomes possible to identify the most affected commodities and devise effective strategies to mitigate these inefficiencies. This study examines post-harvest loss data for carefully selected crops and livestock products from 2022 to 2024, highlighting emerging patterns and their implications for food security.

2.0 MATERIALS AND METHODS

This study relied primarily on secondary data obtained from the Annual Agricultural Performance Survey (APS) reports conducted by the National Agricultural Extension and Research Liaison Services (NAERLS), Ahmadu Bello University, Zaria, for the years 2022, 2023, and 2024. Data on major agricultural commodities commonly produced and processed across Nigeria's six geopolitical and agroecological zones were extracted. The commodities considered included maize, cowpea, cassava, tomato, cattle, cattle milk, layers, and broilers.

2.1 Data Management

The extracted data were organized into commodity-specific datasets showing annual post-harvest loss percentages for each commodity over the study period. Data cleaning and validation were carried out to ensure consistency and completeness before analysis.

2.2 Descriptive Statistical Analysis

Descriptive statistics including percentages, means, standard deviations, and trend charts were used to summarize post-harvest loss levels across commodities and years. These statistics provided an overview of the magnitude and direction of changes in losses over time.

2.3 Chi-Square Analysis

The Chi-Square (χ^2) test of independence was employed to determine whether post-harvest loss levels were significantly associated with commodity type and year. The test was computed as sees equation (1) below:

$$\chi^2 = \sum \frac{(O-E)^2}{E} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

where:

- O= Observed frequency
- E= Expected frequency

The null hypothesis stated that post-harvest losses were independent of commodity type and year. Statistical significance was evaluated at the 5% probability level ($p < 0.05$).

2.4 One-Way Analysis of Variance (ANOVA)

One-way ANOVA was used to compare mean post-harvest loss percentages among commodities. The analysis assessed whether significant differences existed in average losses across crops and livestock products during the study period.

The ANOVA F-statistic was calculated as equation (2):

$$F = \frac{MSB}{MSW} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

where:

- MSB = Mean Square Between Groups
- MSW = Mean Square Within Groups

Significance was determined at α = 0.05.

2.5 Trend Regression Analysis

Linear trend regression analysis was conducted to examine changes in post-harvest losses over time. The model estimated the annual rate of increase or decrease in losses for each commodity using the equation (3):

$$Y_t = \beta_0 + \beta_1 X_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where:

- Y_t= Post-harvest loss percentage
- X_t= Year
- β_0= Intercept
- β_1= Annual trend coefficient
- ε_t= Error term

A negative coefficient indicated a decline in losses over time, while a positive coefficient indicated increasing losses.

2.6 Two-Way Analysis of Variance

A Two-Way ANOVA model was employed to evaluate the combined effects of commodity type and year on post-harvest losses and to determine whether interaction effects existed between these factors. The model used was equation (4):

$$Y_{ij} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \varepsilon_{ij} \quad \text{.................................... (4)}$$

where:

- Y_{ij}= Observed loss percentage
- μ= Overall mean
- α_i= Effect of commodity type
- β_j= Effect of year
- $(\alpha\beta)_{ij}$= Interaction effect
- ε_{ij}= Random error

2.7 Normalized Loss Index Analysis

To facilitate comparison among commodities with different baseline loss levels, a Normalized Loss Index (NLI) equation (5) was computed as:

$$NLI = \frac{X - \bar{X}}{SD} \quad \text{.................................... (5)}$$

where:

- X= Commodity loss value
- $\bar{X}$= Mean loss value
- SD = Standard deviation

The index enabled the identification of commodities with relatively higher vulnerability to post-harvest losses.

2.8 Economic Valuation of Post-Harvest Losses

The economic implications of post-harvest losses were estimated by converting annual percentage changes in losses into monetary values using prevailing farm-gate prices. The annual economic gain or loss was estimated as in equation (6):

$$EV = (\Delta PHL \times Y \times FP) \quad \text{.................................... (6)}$$

where:

- EV = Economic value (₦/ha/year)
- ΔPHL = Annual change in post-harvest loss percentage
- Y = Average yield per hectare

- FP = Farm-gate price per unit output

This analysis quantified the potential financial benefits associated with reductions in post-harvest losses.

2.9 Software Used

All statistical analyses were performed using the Python SciPy library, and Stata (Version 16) with Stata license: 10-student 2-core lab perpetual, serial number 501606272969. Descriptive statistics, Chi-Square tests, ANOVA, regression analysis, and economic valuation calculations were generated using these software packages. Statistical significance was assessed at the 5% level of probability.

3.0 RESULTS AND DISCUSSION

3.1 Crop Losses

Table 1: Post-Harvest Losses in Crops from 2022 to 2024

Year	Maize (%)	Cowpea (%)	Cassava (%)	Tomato (%)
2022	35	27	30	39
2023	39	32	39	33
2024	36	20	19	32

Source: NAERLS/FMARD, APS Report, 2022-2024

Maize has been particularly affected among the crops, recording post-harvest losses of 35% in 2022. This figure increased slightly to 39% in 2023, then declined to 36% in 2024 (Table 1). Such loss figures are not uncommon in sub-Saharan Africa, where annual food losses exceed 30 percent of total crop production representing more than USD$4 billion in value every year (Ogundele, 2022). This is because inadequate storage facilities and rampant pest infestations are frequently observed as primary culprits affecting maize quality and quantity (Abass *et al.,* 2014). Conversely, cowpea exhibited a more variable loss trend, starting at 27% in 2022, increasing to 32% in 2023, and then significantly decreasing to 20% in 2024 (Table 1). The variability in loss rates may be attributed to fluctuations in overall production levels and the effectiveness of pest management strategies implemented by farmers (Baoua *et al*., 2014). Cassava, an inherently perishable crop, demonstrated an equally fluctuating trend; as presented in Table 1, losses were recorded at 30% in 2022, rising sharply to 39% in 2023, before plummeting to 19% in 2024. This instability highlights cassava's vulnerability to post-harvest physiological deterioration, a phenomenon that significantly accelerates decay (Reilly *et al*., 2004). Tomatoes have consistently exhibited high loss rates compared to other crops, with 39% loss in 2022, decreasing to 33% in 2023, and then slightly dropping to 32% in 2024 (Table 1). These elevated figures reflect the inherent challenges faced by perishable horticultural crops, where inadequate cold storage and inefficient transportation systems exacerbate their degradation and shelf life (Kitinoja and Thompson, 2010).

3.2 Livestock Losses

Table 2: Post-Harvest Losses in Livestock and Poultry from 2022 to 2024

Year	Cattle (%)	Cattle Milk (%)	Layers (%)	Broiler (%)
2022	26	40	31	42
2023	24	23	38	29
2024	22	22	19	17

Source: NAERLS/FMARD, APS Report, 2022-2024

In the livestock category, cattle losses have shown relative stability over the years, recording 26% loss in 2022, 24% in 2023, and then to 22% in 2024 (Table 2). These losses are mainly due to cattle rustling and theft. There is a slight decrease yearly, which indicates improvement in security situations in some parts of the country. Losses in cattle milk, however, revealed a more pronounced decline, showing a significantly high percentage of 40% in 2022, decreasing dramatically to 23% in 2023, and settling at 22% in 2024 (Table 2). This encouraging trend may be attributed to advancements in milk handling and preservation techniques, although serious risks of contamination and spoilage remain significant concerns, especially in tropical climates (Omore *et al*., 2005). In the poultry sector, layers experienced an upward trajectory in losses, increasing from 31% in 2022 to 38% in 2023 and a substantial reduction to 19% in 2024 (Table 2). Similarly, losses for broilers were 42% in 2022, fell sharply to 29% in 2023, and continued to drop to 17% in 2024 (Table 2). High losses in poultry are frequently linked to insidious disease outbreaks, inadequate biosecurity practices, and the lack of essential cold chain systems necessary for effective meat preservation (FAO, 2019).

3.3 Statistical Analysis: Chi-Square and One-Way ANOVA Results.

3.3.1 Crop Postharvest Losses

The Chi-square test of independence on the crop data gave chi-square = 5.48, degrees of freedom = 6, and p-value = 0.483. The one-way ANOVA gave F = 1.75 and p-value = 0.235. Both findings show that there is no statistically significant correlation between crop type and year concerning postharvest losses.

Ibrahim et al. (2022) reported that storage failures, spillage, and handling losses were prevalent across all commodity types without much difference. This supports the idea that post-harvest losses in Nigeria are attributable to systemic and horizontal constraints that cut across all commodities simultaneously. Balana et al. (2022) supported this on a national level by showing that the food value chains in Nigeria are facing similar infrastructure shortcomings in bad roads, unreliable electricity, and the inability to pack their products, which impact all perishable goods equally, and that interventions in adoption of postharvest technology at the systemic level are generating livelihood effects across all types of commodities.

3.3.2 Postharvest Losses Poultry and Livestock

In the case of livestock and poultry, the chi-square test gave chi-square = 8.60, p = 0.198; one-way ANOVA: F = 0.22, p = 0.881. Both tests indicate that there are no statistically significant differences in mean losses among cattle, cattle milk, layers, and broilers at the end of the study period. Although there is statistical homogeneity, the overall pattern of descriptive deterioration in all four livestock groups is indicative of aggregate sectoral gain, not demonstrated to be statistically significant, probably because of the narrow time span of three years and because no multi-location replication is present. Nwankwo and Chiekezie (2024) highlight that the longitudinal and geographically disaggregated data on post-harvest losses in Nigeria are suitable in identifying and verifying statistically significant reductions of losses in various agroecological environments and also added that single-location, single-season studies are systematically inadequate to achieve this goal.

3.4 Trend Regression and Coefficient Analysis of Crop

$$Loss\ (it) = alpha\ plus\ beta\ x\ Year\ (t) + epsilon(it) \ldots\ldots\ldots\ldots \quad (7)$$

The combined trend regression above produced an intercept of approximately 19,761 and a year coefficient of -9.78 (t = -4.70; p = 0.001). This notable negative trend is statistically significant, indicating an overall decrease of about 9.8 percentage points per year across all four crops. Barau et al. (2023) assert that gradual system-wide changes in Nigeria's postharvest sector have been achieved through the cumulative effects of NSPRI technology dissemination, agricultural extension reform, and donor-supported investments in the value chain as a whole, which have increased the adoption of improved storage and processing practices, though the spread of changes has not been uniform across all commodities.

The regressions on crops demonstrated high heterogeneity. The annual mean change was greatest in cassava (beta = -5.5; p = 0.04). Danilola et al. (2019) established that farmers who embraced immediate processing strategies in Kwara State incurred much less financial loss than those who did not, supporting the significance of quick processing in mitigating cassava losses. Chiekezie et al. (2023) found this to be true in Anambra State, where they discovered that the structural factors that contribute to cassava loss are mostly poor processing skills and lack of adequate equipment, and policy investment in low-cost processing equipment presented as most profitable per unit of investment in the sector.

As shown in the results, cowpea recorded a decline with a regression coefficient, Cowpea (β = -3.5; p = 0.049) and tomato (beta = -3.5; p = 0.049) had statistically significant moderate annual declines. The declining pattern of tomato loss corresponds to the reports of Yami et al. (2025) that there is a slow pace of use of packaging and market innovations in SMEs in Kano State which cut down the losses at farm level by a significant factor. The crop that had positive but not significant trend was maize (beta = +0.5; p = 0.16). According to Benson et al. (2021), the stagnation in Oyo State was due to low rates of technology adoption in maize storage as most farmers still use traditional maize granaries and open jute sacks despite the established value of hermetic-controlling storage.

3.5 Two-Way ANOVA and Interaction Effects

$$Loss\ (ii) = mu + Crop\ (i) + Year\ (j) + (Crop\ X\ Year)(ij) + epsilon\ (ij) \ldots\ldots\ldots\ldots \quad (8)$$

When using a two-way ANOVA model, it is taken that equation above zero residual degrees of freedom in designs where the number of observations in each single cell is one preclude the possible yielding of formal p-values. This is one of the limitations that are known of small-sample experimental designs (Gujarati and Porter, 2009). Nevertheless, the fact that all the remaining variation was absorbed by the interaction, term significantly proves that the crop responses to year-on-year systemic changes differ. This aligns with the works of Chiekezie et al. (2023) who discovered that the loss pattern of cassava is the most sensitive to the adoption of processing technology. Benson et al. (2021) discovered that without the intervention of hermetic storage, maize losses are structurally inelastic to changes. The diverse nature of the crop reaction measured in studies justifies the conclusion that there is a need to have commodity differentiated postharvest policies as opposed to the uniform loss reduction programs. Ibrahim et al. (2022) and Nwankwo and Chiekezie (2024) agreed and suggested that the national postharvest loss reduction framework of Nigeria should be redesigned by focusing on commodity-specific intervention roadmaps which should target the different bottlenecks in the value chain of each crop.

3.6 Normalized Loss Index and Comparative Commodity risk

The Normalized Loss Index below ensures that tomato is the structurally most susceptible commodity, which is always high even when the index is normalize.

$$Loss\ (ii)/\max\left(Loss\ (i)\right) = Loss\ \ (ij)/\max\left(Loss\ (i)\right) X\ 100 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

Ugonna et al. (2015) reported that more than 50% of fresh tomatoes grown in Nigeria waste every year because of improper storage, poor transportation and insufficient processing facilities making tomato the riskiest of the horticultural products in the country. Yami et al. (2025) using survey data of 1,704 farmers in Kano State, affirmed that the binding constraints that restrict the reduction of losses in the tomato sub-sector lies at the absence of postharvest packaging and poor market logistic.

The greatest proportional decrease (normalized beta = -0.28) was observed in Cassava. Danilola et al. (2019) and Chiekezie et al. (2023) also reported significant proportional changes in cassava post-harvest losses with immediate processing adoption. Cowpea was volatile (normalized beta = -0.18), which is expected due to the sensitivity of cowpea to seasonal pest pressure especially *Callosobruchus maculatus* that depends on temperature and humidity of the season during cropping (Barau et al., 2023). Maize did not respond significantly in terms of proportional improvement (normalized beta about 0.00), which fits the structural limitations reported by Benson et al. (2021).

3.7 Economic Valuation of Postharvest loss trend

Table 3: Economic Impact of Annual Postharvest Loss Trends per Hectare (N)

Crop	Trend (Beta/yr)	Annual Savings - Low	Annual Savings - High	Interpretation
Maize	+0.5%/yr	N9,625 loss	N19,500 loss	Rising losses; structural ` Rigidity
Cowpea	-3.5%/yr	N11,200 saved	N50,400 saved	Moderate improvement
Cassava	-5.5%/yr	N39,160 saved	N85,800 saved	Strongest proportional gain
Tomato	-3.5%/yr	N52,500 saved	N105,000 saved	High-value recovery; remains high-risk

Source: Derived from Analyzed Data and Current Farm-Gate Prices (2026)

A transform of the regression coefficients into Naira-denominated per-hectare per-year estimates suggests an excellent economic argument on why specific postharvest investment would be appropriate. The annual economic effect per hectare due to the specific trend coefficients of the crops with current farm-gate prices as shown in Table 3. Although tomatoes are not the most improving, its high annual saving per hectare renders post-harvest intervention in this sub-sector more economical with possible annual recoveries of up to N105,000/ha. Ugonna et al. (2015) reported that structural postharvest bottlenecks are responsible for depriving the tomato industry in Nigeria of a colossal national economic importance each year. Yami et al. (2025) also established that the economic gains of SME-led packaging innovations are quantifiable in the economic benefits of the tomato supply chain in Kano State, which is supported by high economic returns as indicated by the economic coefficient analysis.

Cassava has the highest rate of long-term improvement, where recoveries were recorded at N85,800/ha/year. Chiekezie et al. (2023) approximated total cassava postharvest loss in Anambra State at 266,116 kg/season at the highest at harvesting (55) and processing (33), implying that the maximum per-hectare economic value of cassava investments is realized using improved harvesting tools and affordable processing equipment. Nwankwo and Chiekezie (2024) agreed with the result above, stating the subsidies on processing equipment as the most economical policy tool that can be used to reduce the losses of cassava. The annual cost of maize in Nigeria is ₦296,625 to ₦561,000/ha, and growing, which explains the importance of the roll-out of hermetic storage and aflatoxin management programs in major maize-producing states in Nigeria, emphasized by Benson et al. (2021) and Barau et al. (2023).

3.8 Economic Impact of Poor Agricultural Produce Handling

The persistent insecurity challenge does not only endanger lives of individuals but also affects the economic stability of rural communities (Smith, 2016). The lack of adequate and robust security measures put in a place has left farmers and transporters vulnerable to these attacks. These challenges do not only disrupt the seamless flow of agricultural produce but also increase production costs, increase post-harvest losses, and limits access to market by farmers (Varshney, 2022).

Research has revealed that insecurity caused by banditry affects transportation networks by damaging critical infrastructure such as roads thereby delaying the delivery agricultural produce especially perishable produce which also spoils before getting to the market, and increasing overall logistics costs (Button, 2015; Banister, 2019, Ajiboye, 2023). Transportation is crucial for linking rural producers to markets, thereby enhancing food security and reducing post-harvest losses (Litman, 2021). Efficient transport systems not only lower logistical costs but also contribute to broader economic development by facilitating trade and market access (Button, 2015). In rural settings, the quality of infrastructure, such as roads and storage facilities, directly impacts the reliability and cost-effectiveness of agricultural supply chains (Ajiboye *et al*., 2009; Ajiboye, 2023). This alone reduces food availability, increases prices and forces Nigeria to import food.

Other economic impacts of poor agricultural produce handling include:

i. Reduced farmer's income and increased poverty levels: Smallholder farmers in some regions lose 30-50% of their income due to spoilage (World Bank, 2022). This accounts for about 72% of the rural poverty rate and discourages investment in agriculture (NBS, 2023).

ii. Decline in export earnings: Nigeria's agricultural exports (cocoa, sesame, cashew) suffer from poor quality due to improper handling. This reduces foreign exchange earnings and limiting economic diversification. For example, 30% of Nigerian cocoa exports were rejected due to mold and poor storage (ICCO, 2022).

iii. High food inflation and rising costs: Poor handling leads to food scarcity, contributing to Nigeria's 33% food inflation (NBS, 2024). This led to higher cost of living and reduced purchasing power of consumers.

iv. Unemployment and underdeveloped agro-processing sector: Missed job opportunities in the agro-industries (e.g., rice milling, fruit juice production, etc.) is a great impact of unemployment. Nigeria processes less than 10% of its agricultural output (CBN, 2023).

4.0 Conclusion

Postharvest losses in the crop and livestock sectors in Nigeria continue to be a significant problem, despite some positive trends in declining losses depending on the commodity and region. The findings confirm that losses of these crops (maize, cowpea, cassava and tomato) and livestock (cattle and poultry) are systemic, this is driven by shared infrastructural deficits: poor roads, unreliable electricity, inadequate storage facilities, insufficient cold chains, and security challenges that disrupt transportation and market access. The economic valuation demonstrates that postharvest loss reduction is a high-return investment, particularly for high-value perishables like tomato and cassava. However, persistent insecurity, low adoption of improved technologies, and weak data infrastructure continue to undermine progress. Without urgent, targeted, and sustained interventions, Nigeria will struggle to meet its food security goals, reduce rural poverty, and diversify its economy away from food imports.

Furthermore, data infrastructure must be urgently enhanced. The current post-harvest losses data in Nigeria lack sufficient data to inform evidence-based policy, hence, there is need to have multi-year, multi-location replicated data sets in order to have the statistical power to carry out rigorous evaluation of postharvest interventions

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