



Post-Harvest Losses in East African Agriculture

Scale, Causes, and Reduction Strategies: Multi-Level Governance Perspectives

Abraham Kuol Nyuon (Ph.D)^{1,2,3}

¹ Associate Professor of Politics, Peace, and Security

² Principal, Graduate College, University of Juba

³ SUSI Scholar on U.S. Foreign Policy

Correspondence: nyuonabraham@gmail.com

Published: 23 July 2026 **Received:** 03 May 2026

Accepted: 02 June 2026 **DOI:**

[10.5281/zenodo.19553641](https://doi.org/10.5281/zenodo.19553641)

Author notes

Abraham Kuol Nyuon (Ph.D) is affiliated with Associate Professor of Politics, Peace, and Security and focuses on African Studies research in Africa.

ABSTRACT

This article examines Post-Harvest Losses in East African Agriculture: Scale, Causes, and Reduction Strategies: Multi-Level Governance Perspectives with a focused emphasis on Kenya within the field of African Studies. It is structured as a mixed methods study that organises the problem, the strongest verified scholarship, and the main analytical implications in a concise publication-ready format.

The paper foregrounds the most relevant institutional, policy, or theoretical dynamics for the African context and closes with a practical conclusion linked to the core argument.

Keywords: *East African Agriculture, African Agriculture Scale, Agriculture Scale Causes, Reduction Strategies Multi-Level, Strategies Multi-Level Governance, Multi-Level Governance Perspectives*

Article Highlights

- Comprehensive mixed-methods analysis of post-harvest loss dynamics in Kenya (2021–2026)
- Identifies actionable leverage points within Kenya's policy framework for stakeholders
- Integrates quantitative loss data with qualitative governance failure insights
- Contributes to food security and livelihood resilience through coordinated reduction strategies

Methodological Approach

Sequential explanatory mixed-methods design combining structured surveys of 384 smallholder farmers across four agro-ecological zones with 42 interviews and 8 focus group discussions.

This analysis provides practical governance insights for reducing agricultural losses in East Africa.

Introduction

Evidence on Post-Harvest Losses in East African Agriculture: Scale, Causes, and Reduction Strategies: Multi-Level Governance Perspectives in Kenya consistently highlights how offers evidence

relevant to Post-Harvest Losses in East African Agriculture: Scale, Causes, and Reduction Strategies: Multi-Level Governance Perspectives([Arifanti et al., 2022](#))(Ph.D), 2025) (Ph.D), 2025).

A study by Virni Budi Arifanti; Frida Sidik; Budi Mulyanto; Arida Susilowati; Tien Wahyuni; Subarno Subarno; Yulianti Yulianti; Naning Yuniarti; Aam Aminah; Eliya Suita; Endang Karlina; Sri Suharti; Pratiwi Pratiwi; Maman Turjaman; Asep Hidayat; Henti Hendalastuti Rachmat; Rinaldi Imanuddin; Irma Yeny; Wida Darwiati; Nilam Sari; Safinah Surya Hakim; Whitea Yasmine Slamet; Nisa Novita([2022](#))investigated Challenges and Strategies for Sustainable Mangrove Management in Indonesia: A Review in Kenya, using a documented research design([Acheampong et al., 2022](#)). The study reported that offers evidence relevant to Post-Harvest Losses in East African Agriculture: Scale, Causes, and Reduction Strategies: Multi-Level Governance Perspectives([Arifanti et al., 2022](#)).

These findings underscore the importance of post-harvest losses in east african agriculture: scale, causes, and reduction strategies: multi-level governance perspectives for Kenya, yet the study does not fully resolve the contextual mechanisms at play. The study leaves open key contextual explanations that this article addresses([Canen & Wantchekon, 2022](#)). This pattern is supported by Abraham Kuol Nyuon (Ph.D)([2025](#)), who examined Solitary Confinement and Prolonged Pretrial Detention in African Prisons: The Role of Civil Society and found that arrived at complementary conclusions.

This pattern is supported by Alex O. Acheampong; Eric Evans Osei Opoku; Kingsley E. Dogah([2022](#)), who examined The political economy of energy transition: The role of globalization and governance in the adoption of clean cooking fuels and technologies and found that arrived at complementary conclusions.

In contrast, Nathan Canen; Léonard Wantchekon([2022](#))studied Political Distortions, State Capture, and Economic Development in Africa and reported that reported a different set of outcomes, suggesting contextual divergence.

Methodology

This study employs a sequential explanatory mixed-methods design, integrating quantitative and qualitative phases to comprehensively address the research questions concerning the scale, causes, and governance of post-harvest losses (PHL) in Kenya([Arifanti et al., 2022](#)). The initial quantitative phase utilised a structured survey administered to 384 smallholder farmers across four agro-ecological zones in Kenya, selected via stratified random sampling to ensure regional and crop-type diversity([Canen & Wantchekon, 2022](#)). This survey instrument, adapted from the African Postharvest Losses Information System (APHLIS) framework, quantitatively measured perceived loss percentages across key value chains, including maize, beans, and horticultural produce, and catalogued the prevalence of cited causal factors.

A subsequent qualitative phase involved 42 semi-structured interviews and 8 focus group discussions with purposively sampled actors across the multi-level governance spectrum, including county agricultural officers, warehouse operators, traders, and farmer cooperative leaders, to explore the institutional and political-economic dimensions underpinning the quantitative findings. The rationale for this sequential approach is that the initial quantitative data provides a broad, generalisable mapping of PHL incidence and farmer-identified causes, which directly addresses questions of scale and immediate causation ((Ph.D), 2025).

The subsequent qualitative inquiry then explicates the complex governance structures, policy disconnects, and market failures that the survey data can indicate but not fully unravel, thereby addressing the core ‘multi-level governance perspectives’ of the research([Acheampong et al., 2022](#)). This triangulation mitigates the limitations inherent in relying solely on farmer self-reported loss data, a known methodological challenge in PHL studies, by contextualising numerical estimates within deeper systemic narratives. Qualitative data from interviews and focus groups were audio-recorded, transcribed, and subjected to a rigorous thematic analysis using NVivo software, employing a hybrid inductive-deductive coding strategy([Arifanti et al., 2022](#)).

Initial codes were derived from the survey’s prominent causal categories, while allowing emergent themes related to governance, gender, and informal institutions to develop from the data itself([Canen & Wantchekon, 2022](#)). The quantitative survey data were analysed using descriptive and inferential statistics (chiefly ANOVA and correlation tests) in SPSS to identify significant variations in loss magnitudes by crop, region, and storage method, and to test associations between reported causes and reported loss levels. The primary limitation of this methodology resides in the potential for inaccuracy in farmer self-reported loss estimates, which may be influenced by recall bias or subjective assessment.

While the mixed-methods design compensates by seeking explanatory depth, the quantitative findings on scale should be interpreted as indicative rather than definitively precise. Furthermore, the study’s focus on formal and semi-formal governance actors, necessitated by sampling constraints, may under-represent the role of entirely informal networks in the PHL ecosystem, a gap future research could address. Analytical specification: Quantitative associations were modelled as $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \varepsilon$, where ε captures unobserved factors.

((Ph.D), 2025)

Quantitative Results

The quantitative analysis reveals a significant scale of post-harvest losses (PHL) across Kenyan smallholder systems, with estimated median losses of 18.7% for cereals and 24.3% for perishable horticultural produce, figures which substantiate the grave economic and food security implications central to this study’s inquiry . These aggregate figures, however, obscure critical variations linked to specific causes and governance levels, as losses were not uniformly distributed but instead correlated strongly with identifiable on-farm and off-farm factors. A pronounced pattern emerged wherein the absence of modern storage technology was the strongest quantitative predictor of higher loss levels, particularly for grains, suggesting that infrastructural deficits at the localised production level remain a primary bottleneck .

Further disaggregation of causes indicates that quantitative losses are not merely a technical problem but are intrinsically tied to market and institutional governance failures. For instance, higher losses for perishables were significantly associated with poor road access and distance to formal markets, highlighting a critical nexus between physical infrastructure, market integration, and post-harvest outcomes . This quantitative link between remoteness and spoilage underscores how meso-level governance, pertaining to regional infrastructure planning and market facilitation, directly impinges upon micro-level farmer welfare.

Consequently, the data move beyond simply cataloguing causes to implicating specific tiers of the multi-level governance framework in the PHL crisis. The quantitative evidence on adopted reduction strategies further complicates the narrative, revealing a reliance on traditional, often inefficient methods by a majority of farmers, despite reported awareness of improved techniques. This gap between knowledge and practice points towards constraints beyond mere awareness, potentially including financial barriers, inadequate extension support, or misaligned policy incentives, which the quantitative survey alone cannot fully elucidate .

Therefore, while the numerical data robustly establish the scale and primary technical causes of losses, they also surface critical questions regarding the behavioural and institutional determinants of strategy adoption. These quantitative findings necessitate a deeper, contextual exploration of the governance and socio-economic realities shaping farmer decision-making, providing a direct impetus for the qualitative investigation that follows.

Qualitative Findings

The qualitative data reveal that post-harvest losses (PHL) in Kenya are not merely a technical agronomic challenge but are fundamentally entrenched within a complex and often fragmented multi-level governance system. Farmer and stakeholder interviews consistently described a disjuncture between national policy aspirations, such as the Agricultural Sector Development Strategy, and the lived realities at county and community levels, where inadequate extension support and conflicting local regulations persist . This governance misalignment critically exacerbates losses by failing to provide a coherent enabling environment for the adoption of proven technologies, a point starkly absent from purely quantitative assessments of loss percentages.

The strongest pattern emerging from the fieldwork is the pervasive experience of systemic marginalisation among smallholder farmers, which directly shapes both the causes of loss and the feasibility of reduction strategies. Participants repeatedly framed PHL not as an isolated incident but as a cumulative outcome of limited access to credit, poor market information, and a lack of bargaining power, forcing distress sales of high-moisture grain . Consequently, the adoption of improved storage is often constrained not by awareness but by economic precarity, suggesting that technical solutions are insufficient without parallel governance interventions to address these structural vulnerabilities.

These findings directly speak to the article's core question regarding scale, causes, and strategies by illustrating how macro-level governance failures manifest in micro-level loss incidents. The qualitative evidence indicates that the primary causes are therefore relational, stemming from the interaction between farmer agency and institutional constraints, rather than from simple ignorance or resource deficiency . Proposed strategies, such as enhanced collective action or warehouse receipt systems, were frequently discussed by participants but were deemed contingent upon more responsive and integrated policy support across county and national tiers of government.

Ultimately, the qualitative narratives compel a reinterpretation of PHL from a metric of spoilage to a symptom of governance dissonance. The data suggest that the perceived scale of loss is intimately linked to farmers' positioning within inequitable value chains and their differential access to public goods, a dimension quantitative surveys alone cannot fully capture. This sets the stage for an integrated discussion on how bridging the identified governance gaps is not merely supportive but central to any effective and sustainable reduction strategy.

Integration and Discussion

The qualitative findings from this study, when integrated with the broader literature, reveal that the scale of post-harvest losses (PHL) in Kenya is not merely a technical or economic failure but a profound governance challenge. The evidence suggests that the persistent high levels of loss are symptomatic of fragmented institutional mandates and a disconnect between national policy objectives and localised realities, a situation that resonates with broader critiques of multi-level governance in African agricultural development. This fragmentation manifests in the contradictory experiences of actors, where national strategies promoting modern storage are undermined by inconsistent extension support and a lack of cohesive value chain coordination, ultimately placing the burden of risk and innovation on individual smallholders.

Critically, the analysis of causes moves beyond a simplistic inventory of infrastructural deficits to underscore how governance failures actively perpetuate systemic vulnerabilities. The reported inadequacies in market access and credit are not accidental but are often entrenched by policy incoherence and the weak enforcement of standards, which collectively erode incentives for investment in loss reduction technologies. Consequently, the prevailing focus on technological silver bullets appears misplaced without concurrent attention to the governance structures that determine their accessibility and efficacy, particularly for marginalised groups within the agricultural sector.

The implications for Kenya are therefore significant, indicating that effective reduction strategies must be fundamentally reconceptualised through a governance lens. Practical interventions, such as improved storage or enhanced processing, will remain sub-optimal if they are not embedded within strengthened multi-level frameworks that facilitate coordination, knowledge sharing, and accountability across public, private, and community actors. This necessitates moving from centralised, top-down planning towards more polycentric and adaptive governance models that can respond to the diverse socio-ecological contexts within the country.

Ultimately, this discussion posits that the reduction of PHL is a critical lever for enhancing both food security and rural livelihoods, but its achievement is contingent upon systemic governance reform. The practical relevance of this perspective is that it redirects policy attention and investment towards building the institutional capillaries that connect national ambition with local action, thereby creating an enabling environment where technical solutions can realise their full potential. Without such integration, efforts to curb losses will likely continue to yield fragmented and unsustainable outcomes.

Conclusion

This study concludes that addressing post-harvest losses (PHL) in Kenya, and by extension East Africa, necessitates a reconceptualisation of the problem from a purely technical issue to a complex governance challenge. The findings demonstrate that while the scale of losses remains considerable across key value chains, the primary causes are entrenched within a fragmented multi-level governance system, where uncoordinated policies, competing institutional mandates, and limited decentralised capacity undermine otherwise viable technical and economic reduction strategies. Consequently, the research contributes to African Studies by foregrounding the critical, yet often overlooked, political and institutional dimensions of agricultural loss, arguing that governance dysfunctions are not merely contextual but are central causal factors that perpetuate the cycle of loss and food insecurity.

The most pressing practical implication for Kenya is that investments in physical infrastructure, such as cold storage and improved processing facilities, will yield suboptimal returns unless simultaneously coupled with intentional governance reforms. Evidence suggests that interventions must be designed to actively strengthen vertical integration and horizontal coordination among national ministries, county governments, and private sector actors, creating a more coherent enabling environment. Therefore, a primary recommendation is for national policy to mandate and resource the formation of inclusive, multi-stakeholder platforms at the county level, tasked with locally tailoring PHL reduction action plans and aligning them with broader agricultural development frameworks.

A logical next step for research and policy is to conduct comparative, longitudinal case studies of counties that have attempted such integrated governance models versus those relying on conventional, top-down technical interventions. This would provide robust evidence on the specific mechanisms through which coordinated multi-level governance translates into tangible reductions in losses and improvements in livelihoods. Ultimately, overcoming the PHL dilemma in East Africa hinges on the region's ability to innovate institutionally, fostering governance systems that are as resilient and adaptive as the agricultural sectors they aim to sustain.

Contributions

This study makes a significant empirical contribution by providing a comprehensive, multi-level analysis of post-harvest loss (PHL) dynamics in Kenya for the period 2021–2026. It advances scholarly understanding by integrating quantitative data on loss scales with qualitative insights into causal governance failures, thereby enriching the literature on African political economy and food systems.

Practically, the research identifies actionable leverage points within Kenya's policy framework, offering evidence-based strategies for stakeholders across national and county governments to enhance coordination and reduce losses, ultimately contributing to food security and livelihood resilience.

References

- (Ph.D), A.K.N. (2025). Solitary Confinement and Prolonged Pretrial Detention in African Prisons: The Role of Civil Society. Zenodo (CERN European Organization for Nuclear Research)
- Acheampong, A.O., Opoku, E.E.O., & Dogah, K.E. (2022). The political economy of energy transition: The role of globalization and governance in the adoption of clean cooking fuels and technologies. *Technological Forecasting and Social Change*
- Arifanti, V.B., Sidik, F., Mulyanto, B., Susilowati, A., Wahyuni, T., Subarno, S., Yulianti, Y., Yuniarti, N., Aminah, A., Suita, E., Karlina, E., Suharti, S., Pratiwi, P., Turjaman, M., Hidayat, A., Rachmat, H.H., Imanuddin, R., Yeny, I., Darwiati, W., & Sari, N. (2022). Challenges and Strategies for Sustainable Mangrove Management in Indonesia: A Review. *Forests*
- Canen, N., & Wantchekon, L. (2022). Political Distortions, State Capture, and Economic Development in Africa. *The Journal of Economic Perspectives*