



A Theoretical Framework for Supply Chain Diagnostics and Governance in South African Food Loss and Waste Reduction

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Published: 28 January 2021 **Received:** 14 October 2020

Accepted: 21 December 2020 **DOI:**
[10.5281/zenodo.19485727](https://doi.org/10.5281/zenodo.19485727)

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ABSTRACT

Background: Food loss and waste (FLW) in South Africa represents a critical inefficiency within agricultural supply chains, undermining food security, economic resilience, and environmental sustainability. Existing reduction strategies often lack a cohesive diagnostic foundation for targeted governance interventions.

Purpose and objectives: This article develops a novel theoretical framework to systematically diagnose the root causes of FLW across post-harvest supply chains and to propose a corresponding governance model for effective intervention.

Keywords: *Supply chain governance, food loss and waste, South Africa, circular economy, sustainable agriculture, value chain analysis*

Article Highlights

- Diagnostic matrix links FLW causes to governance mechanisms
- Bayesian model quantifies loss uncertainty across supply nodes
- First-mile governance failures drive variance in loss rates
- Framework enables targeted, mechanism-based interventions

Methodological Insight

The Bayesian hierarchical model estimates loss proportions across supply chain nodes and commodity groups, with posterior distributions quantifying uncertainty in governance impact assessments.

This theoretical framework bridges diagnostic analysis with actionable governance solutions.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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