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Post-harvest food loss in Ghana's fruit and vegetable supply chains: Evidence from the field

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- Post-harvest food loss remains a persistent issue, with estimates indicating that approximately 30% of food spoils before reaching consumers or retailers.
- This policy brief presents findings from a study examining how market structure and organisation affect food loss.
- A nationwide survey was conducted in Ghana with over 1,500 farmers and 500 informal traders, covering over 20 different types of fruits and vegetables. Causes of food loss are compared across different farmers, locations, and crops to identify common underlying patterns.
- The findings reveal that the percentage of food loss is 1.5 times higher in areas where farmers struggle to find buyers for their crops. Farmers located far from markets experience particularly high levels of food loss, highlighting the role of market access and market structure in reducing waste.

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Horticulture plays a crucial role in Ghana's agricultural sector, supplying both domestic and international markets. However, a significant portion of horticultural crops are lost post-harvest, posing several challenges. Post-harvest loss reduces farmer welfare by lowering agricultural productivity and income, diminishes consumer welfare by limiting food access and raising prices, and weakens agricultural resilience and sustainability.

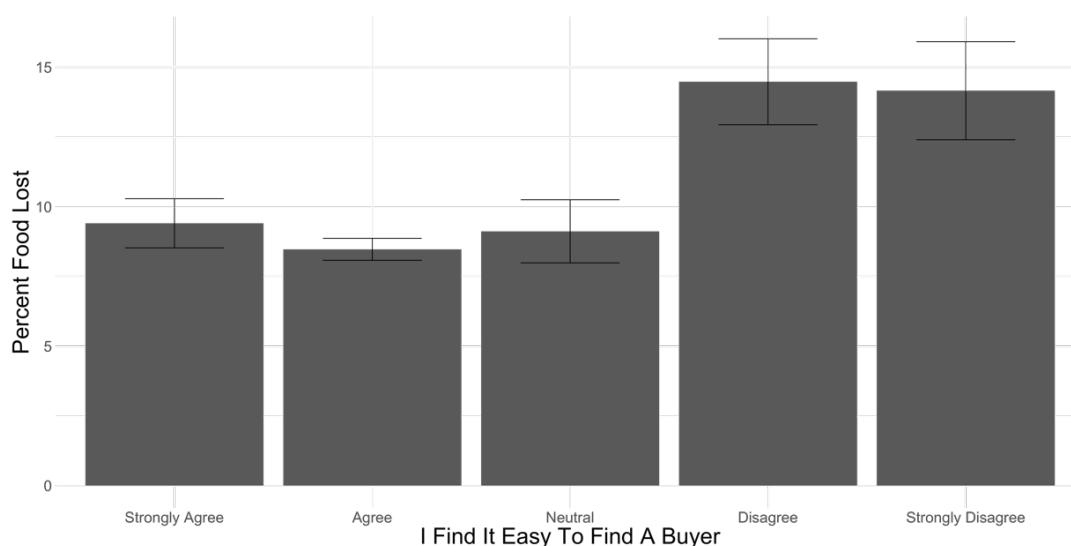
Food loss is often linked to inefficient storage technologies. When farmers rely on suboptimal storage, their crops are more vulnerable to mould, disease, and pests. However, the need for storage technologies would diminish if farmers could quickly and reliably secure buyers. Finding a buyer can be challenging, and farmers who sell at the farmgate or market must commit to going without knowing whether there will be enough interested traders. When reliable outlets exist, farmers can offload their crops with minimal food loss and avoid the need for expensive storage solutions.

As such, this research addressed two main questions:

1. How does market structure and organization relate to post-harvest food loss?
2. How can government policy reduce food loss and improve welfare?

To investigate these questions, a nationwide survey was conducted, covering 1,800 farmers and 500 traders across 13 districts in four major zones (North, South, East, and West). To capture the diversity and variability in farming and trading practices nationwide, districts with higher agricultural activities and trade volumes were selected for the study in each region. Stratified sampling ensured comprehensive coverage and proportional representation from each district. Within villages, data was collected via snowball sampling.

Figure 1: Effect of market structure on food loss



Causes of food loss

Survey data reveals key patterns in how market organisation relates to food loss:

- **Ease of Finding a Buyer:** Farmers who struggle to secure buyers experience 1.5 times the loss compared to farmers who find it easy to sell crops (see Figure 1).
- **Farm/Harvest Size:** Smaller farms face greater difficulty finding buyers and experience higher food loss as a percentage of total production (see Figure 2).
- **Distance to Market:** Farmers located farther from markets struggle more to secure buyers and tend to lose a larger share of their crops (see Figure 2).
- **Investment in Storage:** Farmers who have difficulty securing buyers invest more in storage yet still experience higher losses (see Figure 3).

These findings underscore the role of market access in reducing food loss. Farmers who (a) produce smaller harvests or (b) are located farther from markets face greater challenges in finding buyers. As a result, they experience longer delays in selling their crops and have higher levels of food loss. Moreover, farmers who struggle to find buyers tend to invest more in storage technology. However, despite these greater investments, they still experience more food loss. This suggests that storage technology is an imperfect solution to market inefficiencies.

While storage subsidies are often justified as a way to reduce up-front investment costs, analysis of survey data suggests that many farmers already utilise storage technology. Affordable storage options exist for several crops, and farmers who choose not to invest often do so because the benefits do not outweigh the costs.

Rather than subsidising storage, governments should focus on factors beyond farmers' direct control, such as improving market structure and organisation. Although there is no one-size-fits-all solution for all crops, enhancing the process through which farmers connect with buyers can reduce food loss more effectively than subsidies for storage alone.

Figure 2: Factors affecting ease of finding a buyer

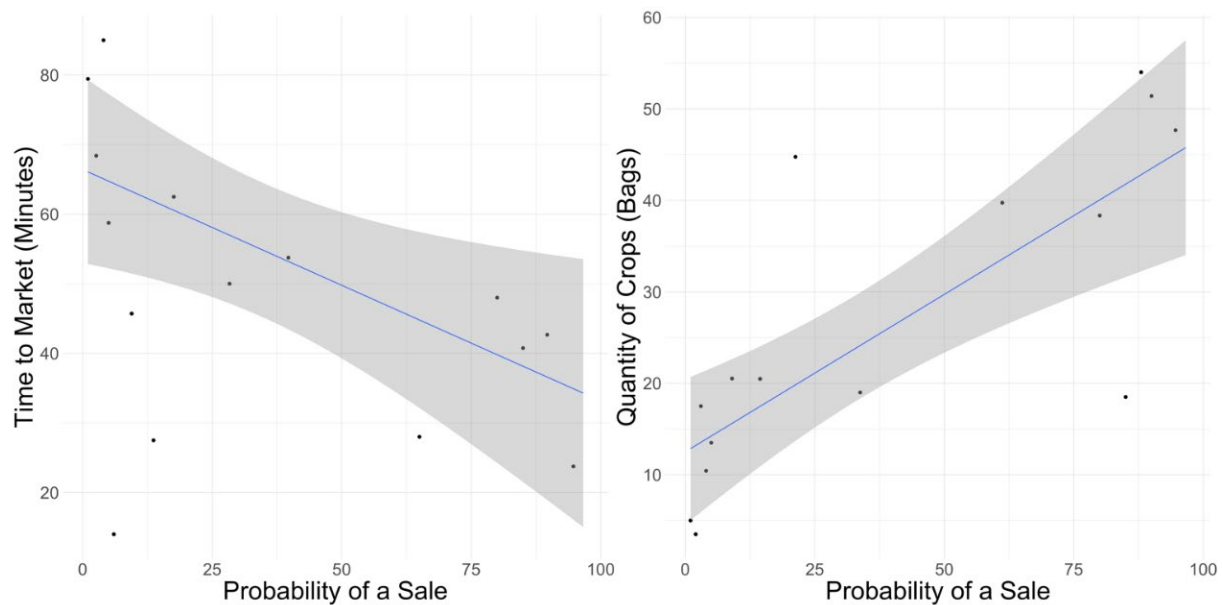
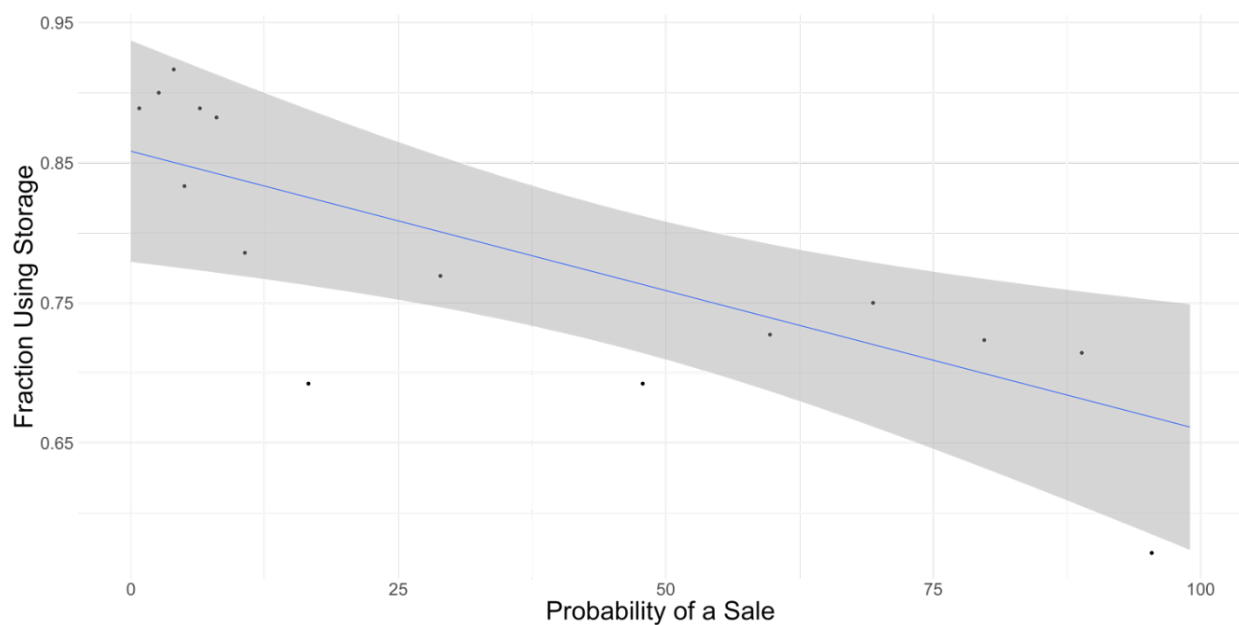


Figure 3: Effect of market structure on storage investment



Policy recommendations

- **Strengthen market organisation and structure.**

A major constraint in reducing food loss is the lack of coordination between farmers and traders. Farmers struggle to find buyers, while traders face challenges in locating suppliers. There are several ways to improve market structure:

- Develop centralised markets: Establishing commodity exchanges can enhance coordination and reduce food loss by providing a structured marketplace.

- Invest in local market infrastructure: Publicly available daily price data can help farmers and traders make informed decisions about where and when to sell.
- Encourage market-based sales: Incentives should be designed to shift sales away from the farm gate and toward established markets, fostering a more organised trading environment.
- Promote long-term relationships: Strengthening trust and collaboration between farmers and traders will create more reliable selling opportunities and reduce inefficiencies.

- **Invest in logistics and transportation.**

Horticulture markets often consist of many small traders who operate independently, which leads to an inefficient allocation of resources. Traders do not coordinate and are thus not optimally distributed across markets. In contrast, large logistics companies can efficiently allocate trucks to the regions and farmers that need them most. Unlike small traders, large logistics companies can also reallocate resources on short notice and can invest in gathering the latest crop and market conditions. Investing in logistics infrastructure and promoting coordinated transportation services will improve market efficiency and reduce food loss.

- **Develop land rental markets.**

Horticulture markets also consist of many small farmers, which makes it difficult for traders to source crops. To fill a truck, traders must coordinate with multiple farmers simultaneously, leading to delays. Traders are often unwilling to travel unless they are certain that there are enough farmers in a region that have crops ready for sale. When farm sizes are larger, the supply of crops is more reliable since traders can fill their trucks in a single big transaction rather than many small ones. By developing land rental markets, farm sizes will increase and lead to less food loss through improved coordination between farmers and traders.