



The leafpad

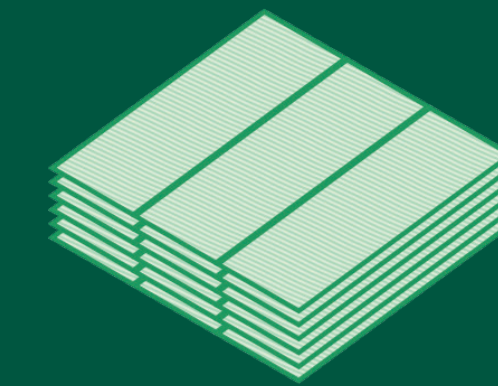
Independent production of transport protection sheets made from banana leaves to reduce post-harvest loss & increase revenue for farmers in Ghana

Post-harvest losses of vegetables in Ghana can reach up to 50% depending on the crop, largely due to poor packaging practices. Reducing these losses is crucial for improving the livelihoods of commercial smallholder farmers. This thesis focuses on developing a simple, cost-effective packaging solution for fresh vegetables to help reduce post-harvest losses in Ghana's local context. Extensive research, including interviews with farmers, vendors, consumers, and horticultural organizations, helped identify opportunities and challenges in the vegetable supply chain, guiding the selection of a focal area for the solution. The project identifies the area with the

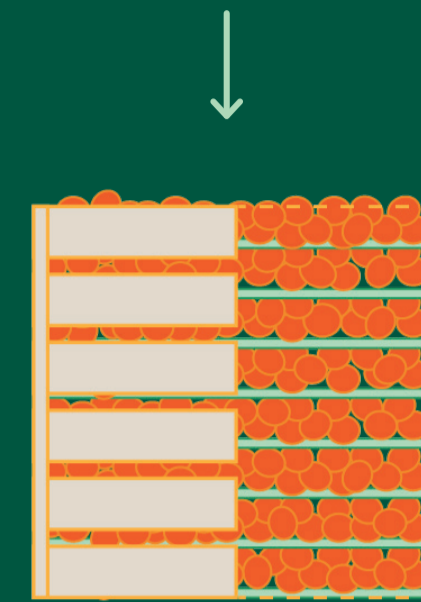
highest potential for impact by collaborating with local stakeholders, focusing on using banana leaves as transport packaging for tomatoes in wooden crates for local markets:

- Banana leaves are an affordable, locally abundant material with packaging potential.
- Inadequate transport packaging is a significant cause of post-harvest losses.
- Tomatoes are the most widely grown, consumed, and wasted vegetable in Ghana.
- Improving crate protection could significantly reduce losses without requiring farmers to purchase new crates.

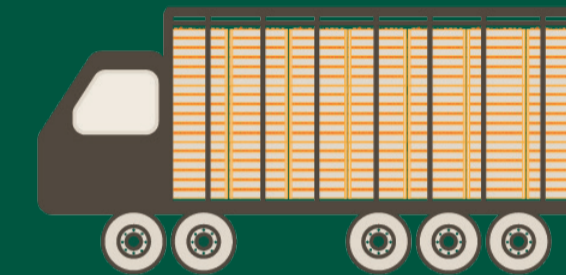
Material tests on banana leaves assessed their properties, leading to rapid prototyping and iterative design. This process resulted in the "leafpad," an effective, affordable design that reduces post-harvest losses while being easy to produce at home with minimal resources.



Production of the leafpads by farmer



Layers of tomatoes alternated by leafpads in wooden crates



Transport to local market by truck



Tomato quality is maintained & losses decreased

The "leafpad" is a protective transport sheet made from banana or plantain leaves that can be easily produced by farmers. Tomatoes are fragile and often suffer from cuts, bruises, and rotting, but using leafpads helps preserve their quality, reduce post-harvest losses, and increase revenue. The pads consist of three layers of leaves, arranged with veins perpendicular for strength and bonded with natural glue, making them sturdy, reusable, and biodegradable.

As the leafpads dry, they shrink slightly, forming air pockets that cushion tomatoes, absorb shocks, and evenly distribute weight to minimize pressure points. They also act as a barrier to slow the spread of microorganisms, with antifungal and antimicrobial properties enhancing protection. To make the leafpads, farmers need basic tools like wooden stencils, drying racks, leaves, and glue.

A simulated transport test showed that leafpads could reduce tomato weight loss by 10% and damage by 20%, potentially boosting farmers' revenue by 12% annually at the wholesale level and 26% at the market level. These estimates are based on average data, but actual results will vary with factors such as farm size, tomato quality, transport distance, and crate specifications.



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