Feed the Future Innovation Lab for Food Security Policy

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Reducing Post-Harvest Losses in Tomatoes

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Introduction

Tomato (Lycopersicon esculenta) is the second most important vegetable crop in the world (after potato) because it contains large amounts of vitamin C, providing 40 percent of the daily value (DV) of vitamin C (Bhowmik, et al., 2012). Tomatoes, consumed in every part of Nigeria, can be grown in many areas in the country but the bulk of its production comes from the north. Nigeria ranks as the highest producer of tomato in sub-Saharan Africa and 13th in the world (Proshare, 2018), but Nigeria is not on the official list of exporting countries of tomato or tomato products. The demand for tomato in Nigeria is currently estimated at about 2.3 million metric tons per annum, while only about 1.8 million metric tons is locally produced in the country (Central Bank of Nigeria, 2014).

Tomatoes in traditional baskets that causes post-harvest Losses.
Source: http://bit.ly/2LkXhSA

Key Findings

- Farmers should have access to improved varieties of seed that have longer shelf life than local varieties.
- To reduce post-harvest losses considerably, logistic control activities as well as the support of extension agents and private tomato processing firms must come into action
- Quality control practices must be adhered to in order to reduce loss due to deterioration and spoilage.

Uncertainty in crop prices makes it difficult for farmers in Nigeria to be confident, that they will obtain a sufficient return from the sale of their harvest. This is because the storage process is technically difficult and expensive, and agricultural prices are subject to strong seasonal variations. To make matters worse, the shelf life of tomatoes is short as it usually lasts one week on the counter and two weeks in the refrigerator. Of the 1.8 million tons of tomatoes produced in Nigeria, over 50% are lost due to poor storage, poor transportation system and lack of processing enterprises (Ugonna, et al, 2015). Postharvest loss can be defined as the degradation in both quantity and quality of a food production from harvest to consumption. Quality losses include those that affect the nutrient/caloric composition, the acceptability, and the edibility of a given product. These losses are generally more common in developed countries (Kader, 2002). We review the literature on tomatoes to explore logistics

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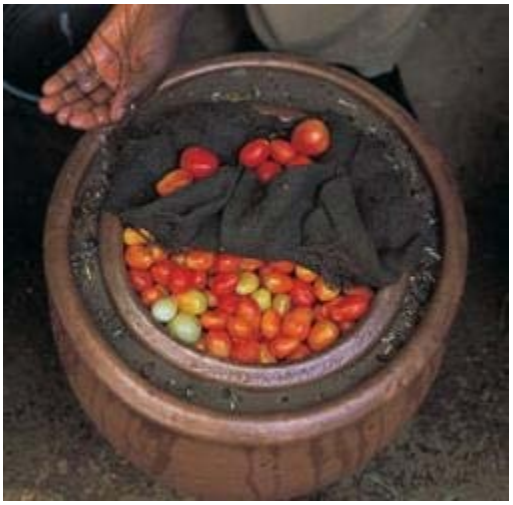
control activities and identify quality control initiatives that can affect post-harvest losses.

Post-Harvest Losses

Tomatoes are delicate fruits and if not handled properly deteriorate very fast. A single tomato can provide about 40% of the daily recommended minimum of vitamin C. What's more, tomatoes supply vitamin A (which supports immunity, vision, and skin health); vitamin K (good for our bones); and potassium (a key nutrient for heart function, muscle contractions, and maintaining a healthy blood pressure and fluid balance). Tomatoes are very vital for our health, hence the need to reduce waste. Post-harvest losses of tomatoes are a major threat to food security in transition countries (Macheka, et al., 2017). Some logistic activities that can affect tomatoes include planning on the amount of fresh produce to harvest and process, selecting mode of transportation and vehicle, vehicle scheduling and routing (Tsolakis et al., 2013).



Zeer pot low tech storage method in Nigeria
Source: http://bit.ly/2ZVq8Ak

Other quality control activities include determining the maturity at which to harvest, deciding on the moment of harvest (e.g. time of the day), harvesting practices, packing practices (e.g. packing configuration), storage practices (e.g. stacking methods), use and type of grading standard, selection of the appropriate type of packaging material, monitoring of temperature during storage and transportation and maintenance of the equipment(Shefelt, 2009; Yahia et al., 2004; Martinez-Romerio et al., 2004; Macheka et al., 2013; Gustavsson et al., 2011;Kitinoja, 2013; Hertog et al., 2007 Luning et al., 2008). Tomatoes are best harvested in the morning or evening, tomatoes left after one hour of harvesting under the sun with a temperature greater than 15^0C begins to deteriorate, the maximum temperature for storing or transporting tomatoes is 15^0C. Because of inadequate electricity supplies, farmers and households can also use the low tech pot in pot (zeer) system using evaporative cooling that can keep tomatoes safe for a few days (Mitcham, 2018). Other methods to reduce post-harvest losses includes drying tomatoes to ensure availability during off season. In Nigerian farms and markets, it is customary to save tomatoes in baskets to allow for ventilation and also as a tool for grading. However, the tomato fruits are injured when baskets are stacked on top of each other during transportation or during storage (conserving space) see picture above.

Tomatoes in crates to reduce post-harvest losses
Source: http://bit.ly/2Y6Y2Ab

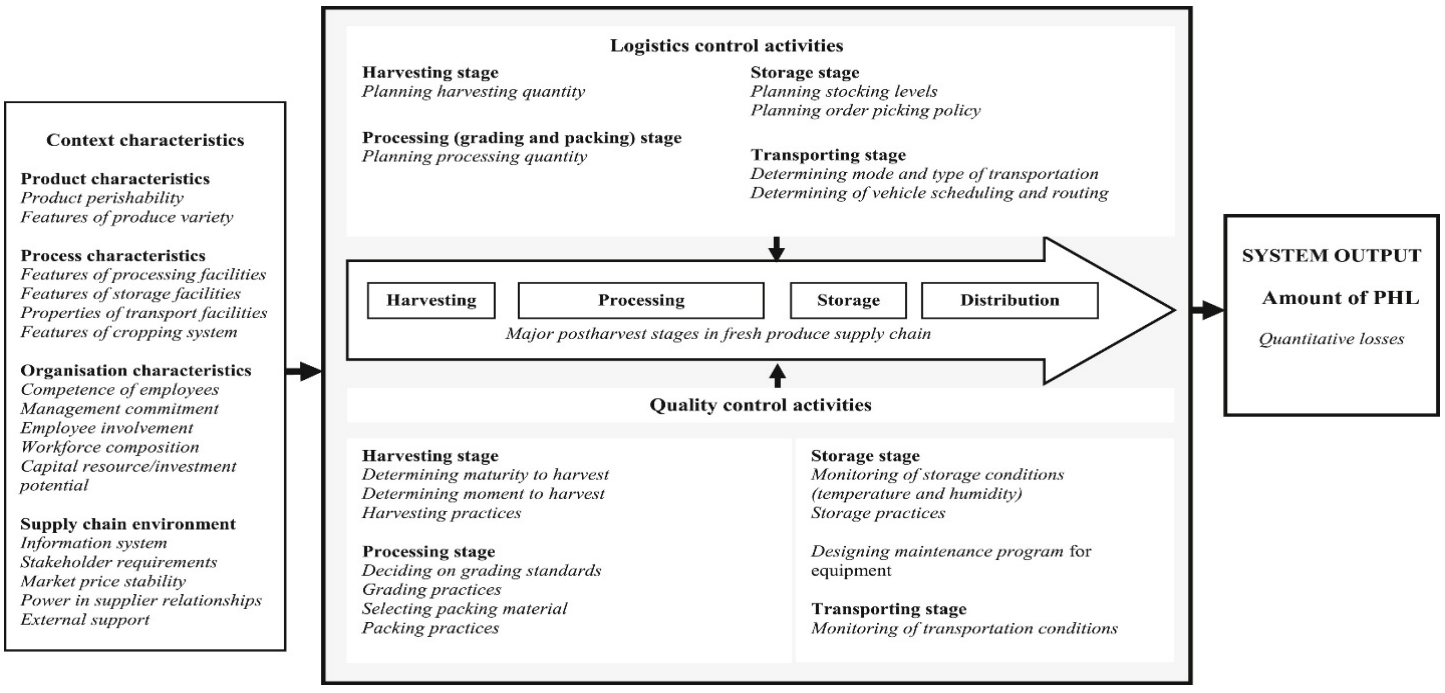
Dried tomatoes

Source: http://bit.ly/2vBuIWp

If post-harvest losses that account for up to 50% of harvested fruits must be combated, farmers will have to change from using traditional baskets to storing their tomatoes in crates because stacking in crates cause less damage to the fruit. Apart from the short life span of tomatoes, their deterioration during storage and transportation also leads to low prices because of reduced quality due to the damage done to the fruits.

Nigerian based tomato-processing companies must also be protected against competition from imported canned tin tomatoes either though a ban or increased tariff to ensure sustainable purchase from local farmers to keep the chain moving. Farmers should have access to improved varieties of tomato seed to ensure high quality of their products and guaranteed purchase at harvest time.

Conceptual framework showing logistic control activities and quality control activities affecting Post-Harvest Losses in tomatoes.



Source: Macheka,et al., 2017

Conclusion

The large amount of post-harvest losses in tomatoes in Nigeria can be reduced if the right logistics and quality control activities are put in place by farmers. The government also has a major role to play to encourage tomato farmers by providing the right environment to encourage growth such as protection of tomato infant industries that are growing. The federal government of Nigeria can aid the post-harvest losses in tomatoes by providing good road network from farm gates to the market to reduce losses that comes during the process of transporting tomatoes from one place to the other. Furthermore, crates can be provided to tomato farmers at a subsidized rate to prevent losses caused by using the traditional baskets which inflict injuries to the fruit. More extension visits to educate farmers on the best time to harvest the fruits and also how to stack their produce to prevent losses.

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