Opportunities to reduce post-harvest losses in the Kenyan mango sector through agroprocessing and agrologistics

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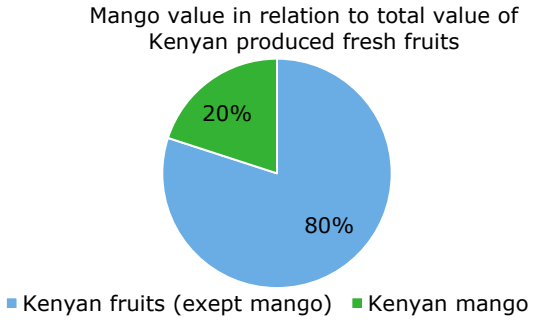
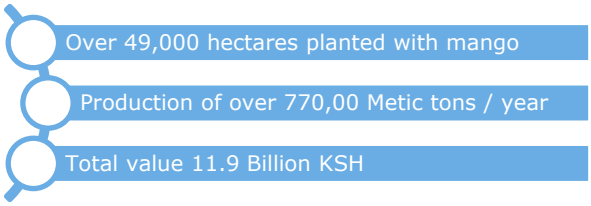
Mango production in Kenya

Kenya ranks 15th in terms of mango production and accounted for 1.5% of global production in 2017. The total land expansion used for mango cultivation has been increasing over the years. Latest reports indicate that mango is grown on 49,098 hectares producing 779,147 MT of mangoes valued at 11.9 billion KSH which is about 20% of the total value of fruits produced in Kenya.

This document is a summary of the full report: A food system analysis of Kenya's mango, avocado and poultry sectors.





Currently, the domestic market for mango is significantly larger than the export market both in volumes and in value, although international demand for mangoes is growing and expected to grow in the short future. Small scale farmers sell and distribute their products through informal networks where marketing agents play a key role between rural smallholder producers and rural wholesalers, urban wholesalers, local traders, supermarkets, shop-owners and street sellers.

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Post-harvest food losses

Post-harvest losses occur on-farm, during transport, during storage at wholesale markets and retailers premises. As can be seen in figure 1, major causes for post -harvest losses are – next to oversupply during peak season – improper handling, pests and diseases. In addition, there is a general lack of temperature-controlled storage during transport, at wholesale and retail points. Approximately 36% of the mango's that are harvested are lost before they are consumed.

Figure 1 *Post-harvest loss profile of the Kenyan mango*

There are numerous opportunities to effectively reduce post-harvest losses in mango. Addressing the root causes of post-harvest loss requires taking on a food system approach whereby supportive policies are integrated with a series of complementary interventions addressing production practices, suitable technological interventions and supply chain integration including post-harvest handling services, value addition and market information systems. Effective reduction of post-harvest losses requires a system approach bundling enabling policies that support improved collaboration within the sector and create incentives to invest in post-harvest loss reduction. Due to the complex nature of the supply chain and the diversity of actors, investments in appropriate technology needs to go hand in hand with integrated sector development approaches.

Integrated sector transformation

A combination of supportive sector-wide policies, innovative financing and integrated sector transformation must accompany the specific opportunities in agro-logistics and agro-processing to reduce the post-harvest losses that have been identified.

The desired integrated sector interventions include training of farmers, traders, and vendors as key actors with the potential to reduce losses significantly (Good Agricultural Practices, product handling, Integrated Pest Management), sector coordination (available market information, formal contracts, market linkages), an enabling policy environment (incentives, regulations), stronger producer organizations, improved access to finance, and improved infrastructure, as well as a system of traceability, quality assurance and food safety.

Business opportunities

This study has identified specific business opportunities which contribute to reducing food loss, generate a positive economic impact on the sector, and meet the requirements of (Dutch) investors or product suppliers.

Temperature-controlled storage
Installing cold storage facilities is the most effective mechanism to extend the shelf life of avocados and reduce transport and storage losses by 30-60%. Temperature-controlled storage solutions are divided into three categories, based on scale:

1. Small scale cooling technologies (e.g., charcoal cooler) for local and regional markets.
2. Small to medium scale (container-sized, 20 ft) cooling or cold storage solutions that offer opportunities for mobile cold storage and aggregation at the smallholder farmer group level. Suitable for export or domestic markets.
3. Large, industrial-scale, high-tech cold storage and aggregation centres, feasible for logistical hubs. Suitable for export (mainly EU). Investment ranges between EUR 5-60 million, depending on the size and technological requirements.

Aggregation facilities
Closely related to temperature-controlled storage is aggregation. Aggregation is the sorting, grading, and combining volumes of the same product from different producers. Aggregation facilities can reduce transport and storage losses by 20%.

Packaging solutions and shelf-life extension techniques
Packaging can greatly improve product quality and reduce losses. Similar to cold chain facilities, packaging is not a standalone solution as it is most effective in combination with other interventions, most notably storage and aggregation. It has the option to greatly improve product quality and safety and reduce transport and storage losses by 30-40%.

Packaging includes crates, coatings, and packaging lines for retail. Investments for large-scale packaging equipment is estimated at EUR 460,000, suitable for large volumes (>100 MT/day). Packaging and coating has the potential to prolong mango's shelf life, which is particularly relevant for high value produce that is transported over long distances through sea freight.

Post-harvest value addition and processing facilities
There are several processing possibilities including mango juice (pulp or concentrate), dried products, chips, chutney, and candy bars. The opportunity of drying mangos to reduce food loss and possibly generate additional economic gains for both farmers and processors has not been fully leveraged, given the (expected) unfulfilled demand for dried fruits. Processing products has many advantages including the use of products otherwise lost (lower-quality products), turning inedible parts of products into edible products, and value-addition. Non the less, specific product quality and specific handling practices are required for most value added consumer products.

Recommendations

1. With the production of mangos expected to increase, the need for professional and efficient production, storage, transport, packaging, and processing increases. The Dutch private sector can assist Kenyan players and enter this emerging region by partnering with financial institutions.
2. Relevant Dutch companies are recommended to explore the Kenyan mango export market for the supply of aggregation and packaging solutions to streamline production processes and increase the competitive edge of the country. The same applies to Kenyan private-sector corporations producing juices and dried products, as they see a largely unfulfilled market.
3. Effective and sustainable post-harvest loss reduction requires sector-wide, bundled approaches whereby private and public sector organizations collaborate to jointly advance and professionalize the sector.

Details of the analysis and the identified business opportunities for the mango sector can be found in section 3.1 and chapter 5 of the full report.

This report can be downloaded for free at https://edepot.wur.nl/559109 or at www.wur.eu/cdi (under publications).

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