

# As solar refrigerator keeps mangoes cold, farmers' profits heat up

By [Leopold Obi](#)

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It is a hot and cloudless morning, a sign that it will be sunny right through the afternoon. Joseph Mailu moves along rows of fruiting mango trees with a long pole in his hand, harvesting the mature fruits. The succulent green mangoes drop inside a net tied to the tip of the pole which prevents them from falling on the ground and being damaged.



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The quality of the fruit is a big concern to farmers and traders hoping to sell to the lucrative export market.

But now farmers in Nziu are benefitting from two innovations - solar-powered cold storage, and biological pest control - to help protect their harvest against the effects of climate change.

Even with the careful skills of professional harvesters like 31-year-old Mailu, efforts to access high-end markets used to be difficult for many farmers in Nziu, a village in Makueni Country, some 250 km (150 miles) from Kenya's capital, Nairobi. But the new cold storage facility, which preserves the farmers' highly perishable fruit and stops it from going rotten before it reaches consumers' tables, is making things easier.

The state Department of Agriculture estimates that 30-50 percent of harvested fruit in Kenya goes to waste due to poor

post-harvest handling. The majority of Kenya's smallholder farmers lack proper cold storage to preserve the quality or extend the shelf-life of their fruit, leaving them at the mercy of middlemen who buy their produce and earn most of the profit. With low-cost cold storage, however, about 150 of Nziu's farmers can now keep their harvest refrigerated while they scout for prospective buyers.

The refrigerator, the first of its kind in Kenya, was built in late 2015 by the Rockefeller Foundation and TechnoServe, a nongovernmental organisation, under the YieldWise programme, an initiative aimed at cutting post-harvest losses among local mango farmers.

The facility is fitted with four solar panels, an inverter and a car battery which enables it to store power to keep running during the night hours.

Makueni County is semi-arid and hot, especially during the mango harvesting season in January and February, but the cold storage room can reduce the ambient temperature from 35 degrees Celsius to as low as 17 degrees, which slows the ripening of the mangoes by several days. John Musomba, a farmer in charge of the refrigerated storehouse, said it can store up to 3.4 tonnes of mangoes.

## Organic pest control

Mango growers have to contend not only with the heat but also with pests that can ruin their crops. *Bactrocera dorsalis*, a species of fruit fly originating in Asia, has become a huge problem in Africa as a result of the warming effects of climate change. The flies are a menace to many mango growers in the region, destroying more than 60 percent of farm fruits and leading to an annual loss of up to \$2 billion to farmers across the continent, experts say.

Musomba, who has two acres (0.8 hectares) of mango trees, uses several biological control measures to control the flies. "In the past we sprayed chemical pesticides to control the flies, but buyers turned down our produce due to high chemical residues. But since we switched to organic farming, traders are now trooping around here for our fruits," he said.

Countries like the United States ban horticultural produce from African countries where invasions of the *B. dorsalis* fruit fly have been reported, said Ivan Rwomushana, who leads the fruit fly integrated pest management programme at the International Centre of Insect Physiology and Entomology (ICIPE) in Nairobi. Rwomushana says ICIPE is training farmers in several biological methods to control fruit flies, including pheromone traps to capture and kill male fruit flies, and parasitic wasps.

Sunday Ekesi, interim director of research and partnership at ICIPE, said the organisation is also developing a treatment that involves immersing mangoes in warm water for 45 minutes to kill any fruit flies on the fruit surface.

Mamadou Biteye, Africa regional managing director for the Rockefeller Foundation, argues the Kenyan government should develop policies to support wider use of such interventions. "Farmers don't make any profit if they lose half of their harvest at the farm level, therefore such policies which facilitate access to finance and technology for farmers are very critical," Biteye said.

The foundation is investing \$130 million over the next five years to support post-harvest management initiatives.

The farmers in Nziu know how valuable that could prove. "With the organic control interventions in addition to the cold storage facility, I now harvest and sell 250 tonnes of mango fruits in a year," Musomba said - more than twice the 100 tonnes he harvested two years ago when these tools were not available.

Musomba says that the farmers in the collective who use the cold storage facility can sell their mangoes for 20 Kenyan shillings (\$0.20) a kilo, far more than the 2 shillings per mango that they used to get when selling hastily to brokers before the fruit could rot.

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