



*Beatrice Kimani, the University of Nairobi student who has developed a simple cooling innovation to help smallholder farmers reduce post-harvest losses.*  
Photo Credit: Zablon Oyugi

# Student's simple cooler box to ease farmers' post-harvest worries

By Zablon Oyugi

**I**N 2019 Beatrice Kimani, 26, took part in the Kenya Population and Housing Census (KPHC) as one of the enumerators, a task that exposed her to the many challenges smallholder farmers faced trying to preserve fresh produce.

Lack of cooling facilities contributed to food wastages and sales of fresh produce at throwaway prices.

Fast forward to 2021 and the then undergraduate student embarked on a project focused on addressing post-harvest losses through innovative concept of designing beeswax for preserving fruits and vegetables.

"This approach was becoming hectic because it needed much wax for

coating the produce and at some point the outcome was a thick covering layer which was not that pleasing," said Kimani, now a postgraduate student at the University of Nairobi (UoN).

So she resorted to beeswax cloth to try and improve on the idea but this too, was not effective in preserving the fresh produce as expected.

Luckily for the biosystems engineering postgraduate student, Prof Duncan Mbuge, her supervisor and former chairman at the university's Biosystems Engineering Department, took advantage of an MoU between UoN and the United Kingdom's University of Birmingham to facilitate an introduction that would see her improve on the innovation.

The MoU was meant to support learners' projects that sought to offer solutions to the challenges in the agriculture sector.

"He connected me with Dr. Daniel Hefft and Prakash Korde (Director of ValueForm Limited UK), like-minded individuals who were equally passionate about advancing post-harvest management. It was as a result of this dynamic collaboration that the spark of the idea truly ignited," said Kimani.

Prakash not only came up with a fresh idea to improve on the innovation but also serves as its financial adviser and mentor while Hefft had conducted similar tests in the UK with an eye on export purposes.

A year later after several lab tests on the fresh idea using various fresh produce such as tomatoes, flowers, avocados, mangoes, pumpkin leaves, and pears that gave satisfactory results, the team came up with an actual set-up.

The tests birthed what the team decided to name Kimani Box Levfresh, a simple set-up made up of two boxes, one inside the other, and in between them an insulation material, preferably dry grass.

The inner box has ethylene gas inhibitors in small biodegradable bags placed at the bottom and the sides to create a middle space where fresh produce such as fruits and vegetables are put.

“This arrangement uses the concept of insulation. It ensures that no heat is being produced due to the absence of ethylene gas hence the produce can stay fresh for up to 48 days as the boxes are also left open,” said Kimani.

The boxes are made from recycled cartons, making the set-up affordable for users. This is in addition to the gas inhibitors which are used for lifetime just by changing the bags or removing and sun drying them for reuse.

“We can set it up for home and commercial users at about Sh1,000 besides training them on how they can use and maintain it but full rollout will be early next year,” said Kimani.

The amount of the produce to be preserved depends on the size of the boxes and the number of the ethylene gas inhibitors used.

The team is currently focusing on small-scale home users and fresh produce vendors and hopes to accommodate large-scale users or consumers if more sponsors come aboard to enable them to improve on the research.

According to Kimani, so far the project costs are estimated at over Sh1 million, funds that have come from her partners following the MoU between UoN and UK's ValueForm Limited to address post-harvest losses.

In addition, the project has won 15000 pounds grant from UK Innovate, the UK's national innovation agency that support business-led innovation in all sectors, technologies and UK regions.

## **Trials**

Being a new product Kimani Box Levfresh has had to go trials and test with target users to confirm its workability.

On this, the team has worked with some farmers in Kirinyaga County by giving out the set up to them to use for a period of time.

“We have been encouraged by the good results from our first users. For tomato farmers, their produce were able to stay fresh for up to 48 days while avocado farmers recorded 14-16 days of freshness of their produce,” said Kimani.

It has also recorded 14-16 days of freshness for mangoes, roses, and pumpkin leaves among others.

“The demonstrations have given exceptional results; the insulated Kimani Box Levfresh far surpassed the industry-standard of 14-day freshness requirement for preserving fresh produce,” she said.

Paul Kariuki, a tomato farmer from Mwea in Kirinyaga County who took part during trials, said the set-up works well as it could keep his freshly harvested tomatoes in the same condition for over two weeks.

“The only thing I discovered is that, overripe or damaged tomatoes by pests, diseases or otherwise are not fit for preservation by the box as they release water in the set-up, making it unsafe for other good fruits,” said Kariuki.

The box can be used six to nine times while the gas inhibitors are used for a lifetime just by changing the bags or removing and sun drying them for reuse.



Food and Agriculture Organization of the United Nations (FAO) defines post-harvest losses as measurable losses in edible food mass (quantity) or nutritional value (quality) of food intended for human consumption.

The problem of post-harvest loss is especially acute for horticultural crops. A recent review of International Food Policy Research Institute (IFPRI) report indicates that most loss estimates for these crops ranged from over just 20 percent to 35 percent.

According to Ojepat Okisegere, the chief executive officer at Fresh Produce Consortium of Kenya, the country loses between 40 and 60 percent of fresh produce, especially vegetables, fruits, herbs, and spices, through post-harvest losses.

This happens because most of the growers, aggregators, vendors and value chain actors do not have the facilities or do not know how to manage the losses.

“It is for this reason that more innovations and capacity building programmes are welcomed in the sector to help farmers since every post-harvest loss to a farmer is actually a loss for households and them in terms of business,” said Okisegere.

### Achievements

Besides the positive feedback from a number of users who have interacted with Kimani Box Levfresh set-up, Kimani says the innovation has opened the way for them to meet and share with other scholars home and away.

“As a result of this simple innovation, we have got exposure through showcasing it in some agri-events in the country besides travelling overseas to learn and exchange knowledge with other scholars for growth,” she said.



**The inner box has ethylene gas inhibitors in small biodegradable bags placed at the bottom and the sides to create a middle space where fresh produce such as fruits and vegetables are put. Photo Credit: Zablun Oyugi**

### Challenges

One of the major challenges the innovators are now facing is raising the funds they need to improve the set-up and be able to roll it out to large-scale users, mostly fruit and vegetable vendors who are very willing and interested to buy.

“Currently we are trying to push the message out there hoping more partners will come on board to support the innovation and help our producers reduce post-harvest losses and improve on food security,” said Kimani.

The other challenge is getting the support of leading agricultural organisations such as the Kenya Agricultural and Livestock Research Organization (KALRO) and the Alliance for a Green Revolution in Africa (AGRA) among others to associate with the product to boost its acceptance by farmers.

Such backing, said Kimani, would boost the product’s credibility among farmers and other value chain players.

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*A group of people pose for a photo at the agribusiness firm Greenhouse Ventures.  
 Photo Credit: Elias Ngalame*

# A green future for Cameroon's agriculture

By Elias Ngalame

**UNSUSTAINABLE** farming practices, exacerbated by climate change, have led to dwindling food crop production in many parts of Cameroon in the past two decades and prompted an increase in food imports, according to the Ministry of Agriculture.

The good news is that the future of food crop production is looking brighter, thanks to the rising adoption of climate-smart farming technologies like greenhouses.

Roland Fomundam, the CEO of agribusiness firm Greenhouse Ventures, says greenhouse technology has made farming more attractive in communities, especially among the youth.

"We have succeeded in rebranding agriculture in Cameroon, making it very attractive for others. We have since trained over 5000 young farmers who are replicating the Greenhouse technology in different parts of the country," says Fomundam.

His organisation was founded in 2014 with a common goal to increase quality and quantity of food, ensuring production and profit with the use of the low-cost climate-smart greenhouse technology.

Greenhouse farming involves use of structures covered by a special plastic or glass for the cultivation of crops, mostly vegetables and herbs under controlled environments.

Christopher Ekungwe, the Southwest regional delegate for agriculture, says adoption of greenhouses has significantly improved production, availability and variety of food supplies in local markets.

"Before it was hard to find produce such as green spices in our local markets and even if you found it, it was very costly. Now, these items can be supplied directly to households by using a phone," says Ekungwe.