

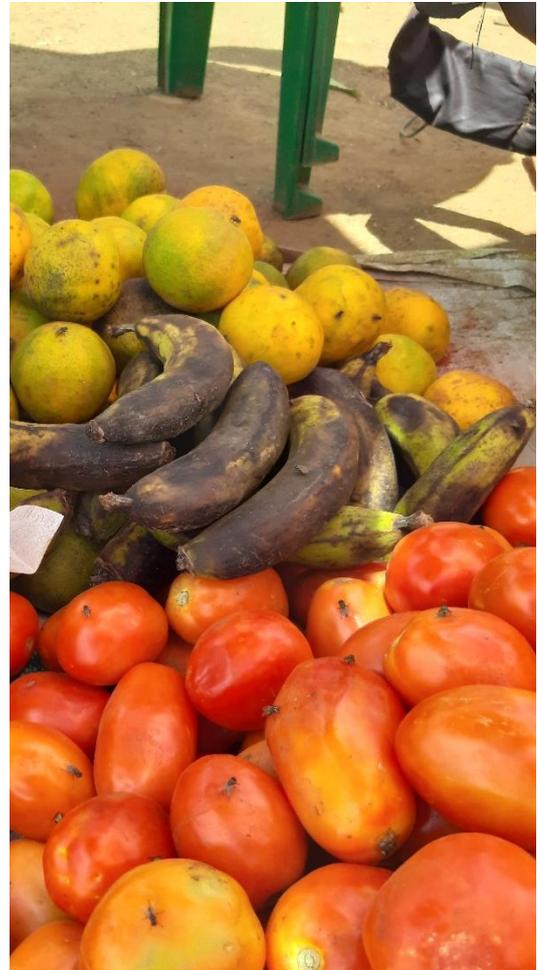
Case study

How solar cooling can help to reduce post-harvest losses: Construction of the CELLUX pilot plant in Kithimani / Kenya



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Post-harvest losses – a huge problem, especially in the Sub-Saharan countries

According to the Food and Agriculture Organisation of the United Nations, 30% of food produced for human consumption is lost or wasted along the supply chain every year. This is a 1.3 billion metric tons of food that doesn't ever reach the consumer. Some reports have estimated that this lost or wasted food could be used to feed 1.6 billion people every year.

In Africa, the losses are even higher: between 30% and 50%. They occur mainly downstream, between the production and retail stages of the supply chain. Fruit and vegetable losses are estimated to be 50% or more. This estimate is cumulative because losses occur at every stage of the supply chain – from production to the consumption. Losses at the farm level can be attributed to poor harvest practices and poor handling.

Generally, any loss of produce translates to lost production resources, mainly land, water, energy and inputs. It is also lost income for the various actors in the supply chain. A 2011 World Bank study estimated the value of African grain losses alone at USD\$4 billion for grains alone in Africa. This could feed 1.6 billion people each year.

This study further showed that 470 million smallholder farmers suffer a decline of 15% income, while 25% of fresh water and 20% of farmland is wasted on unconsumed food. These figures are alarming. But they're important in highlighting the seriousness and impact of post-harvest losses.

The world's population is projected to reach 9 billion people by 2050, with Africa contributing more than half of that increase. To feed these people, production must increase by up to 70%. However production resources – land, water, energy and so on – are limited and inelastic. Instead of producing more, we could increase the amount of food available by ensuring that most of the food produced for human consumption reaches the end user.

Quantitative and qualitative losses negatively impact on all aspects of food security – access, availability, utilisation and stability. There can be no sustainable food systems when 30% of food produced using limited production resources is lost or wasted along the supply chains.

What are the main drivers of Africa's post-harvest losses and which crops are affected?

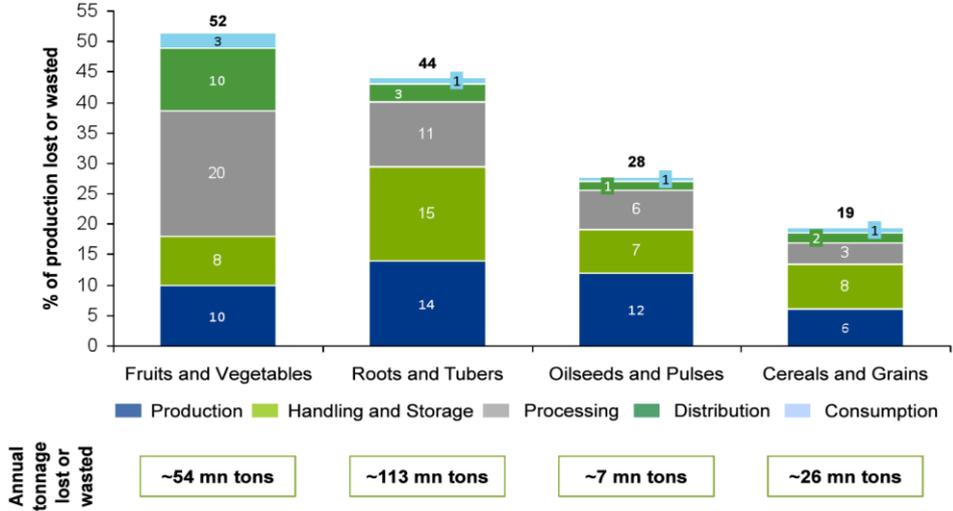
Losses occur at all stages between production at the farm level through to consumption. There are unique challenges at each stage depending on specific commodities and value chains as well as context. The causes are complex and interrelated; actions or lack of action at one stage of the supply chain could be the driver of post-harvest loss at a different stage.

Very often, qualitative and quantitative losses are driven by poor or wrong harvest practices and poor handling. This includes poor storage or packaging, mode of transport, processing practices, lack or poor access to markets and poor coordination among the actors in the supply chains. There are other broader factors such as poor infrastructure and lack of policies that have a direct impact on post-harvest issues.

CELLUX SOLAR POWERED COLD STORE



Some crops are more affected by post-harvest losses than others. Fruits and vegetables incur the greatest percentage loss (approximately 52% of production, or 54 million tons per annum), while roots and tubers (e.g. cassava) on the other hand incur the highest volumes of loss (in terms of absolute production lost). Those losses predominantly occur soon after harvest due to the high levels of perishability associated with these crop types. Cassava, for example, can perish within 48 hours of harvesting due to post-harvest physiological deterioration (PPD).



Food losses by crop type in Sub-Saharan countries, source: 'Global food losses and food waste', FAO; FAOSTAT

Many technologies and innovations have been developed to address the various causes of food losses. However, some of these have either not reached the targeted user or have not had the desired result. This is partly because people aren't aware of them or can't afford them. Some technologies are also unsuitable for the African context.

Creating awareness about the applicable technologies and demonstrating their benefits is one way to yield results. This strategy has been used in promoting hermetic storage bags for grains. Hermetic storage is a proven solution for the threat of storage pests like weevils which attack stored grain. Its adoption has risen because of stakeholders' concerted efforts.

The same aggressive campaign should be adopted for other technologies that are useful for smallholder farmers. For the production of fruits, vegetables, roots and tubers, proper cooling facilities are one of the key factors which will help to drastically reduce post-harvest losses and though to increase the income of farmers in a significant way.

CELLUX has been imagined and designed to be part of this solution. Due to its modular structure, it can be transported and built almost everywhere. Totally grid-independent and easy to maintain, it is very simple to use and will provide a safe storage for all types of highly perishable but also very valuable crops like French beans, snow peas, mangoes or avocados which can make farming a very profitable business when the high quality of fresh produce can be preserved until it will be sold.

Source : <https://theconversation.com/why-reducing-post-harvest-losses-is-a-priority-for-africa-87312>

Introducing CELLUX – technical data sheet, housing requirements

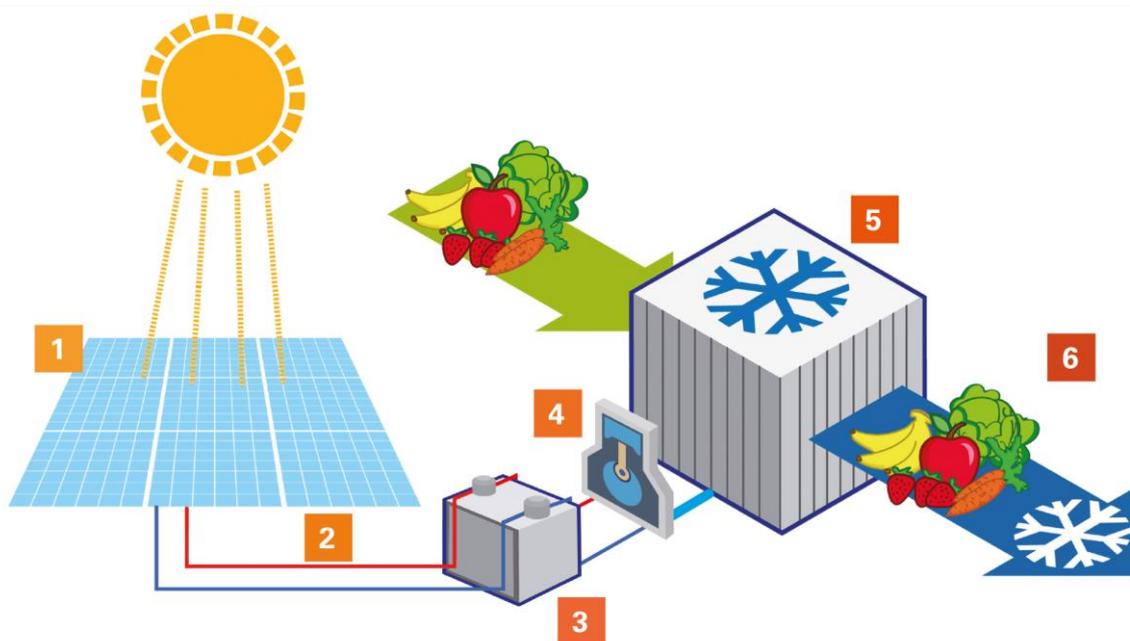
KRAMER GmbH, who developed CELLUX together with the solar cooling specialist suncooling GmbH, is one of the market leaders for cold stores in Europe. The idea behind the project was to provide a simple and easy to use off-grid cooling device at a reasonable price which could be installed almost everywhere and will help efficiently to reduce post-harvest losses.

The modular system

CELLUX is separated into its individual parts and shipped to its final location. The cooling cell is then assembled on site with the help of an enclosed easy-to-understand instruction guide. Even a trained layman will be able to do the assembling and the electrical connection of the cooling cell within less than two days of work.

How it works

CELLUX is built of high-quality, yet simple components which guarantee a sustainable and grid-independent functionality.



1. The electricity supply is generated by solar panels which can either be mounted on the roof of the cooling cell or on a separate support structure.
2. The battery is powered by the energy generated from the solar panels.
3. The battery storage supplies the chiller with constant energy whereby voltage peaks of energy production are absorbed by the storage. It therefore guarantees the operation of the cold room even in poor weather conditions.
4. The cooling unit constantly cools the temperature in the cell to a selected temperature in the range between 6 °C and 10 °C (43 °F and 50 °F).
5. The cooling cell can either be integrated into an existing building or housed separately.
6. The cooling cell is shipped in individual parts to its location where it's assembled without much effort

Technical data

CELLUX S

COOLING CELL

Size (LWH): 4.40 x 3.20 x 2.47 m
 Door size: 0.90 x 2.00 m
 Wall thickness: 100 mm
 U-value: 0.21 W/m²K

COOLING UNIT

Cooling capacity: 3.0 kW
 Refrigerant: R134A ozone friendly
 Maximum outside temperature: 55 °C (131 °F)

PHOTOVOLTAIC SYSTEM

PV-Power: 3180 Wp
 Number of solar panels: 4 x 3 Panels
 Battery capacity: 229 Ah
 Self-sufficiency (100 % duty cycle): 8 h

PV UPGRADE 1

PV-Power: 4770 Wp
 Number of solar panels: 6 x 3 panels
 Battery capacity: 333 Ah
 Self-sufficiency (100 % duty cycle): 12 h

PV UPGRADE 2

PV-Power: 5 565 Wp
 Number of solar panels: 9 x 3 panels
 Battery capacity: 460 Ah
 Self-sufficiency (100 % duty cycle): 24 h

CELLUX L

COOLING CELL

Size (LWH): 6.60 x 3.20 x 2.47 m
 Door size: 0.90 x 2.00 m
 Wall thickness: 100 mm
 U-value: 0.21 W/m²K

COOLING UNIT

Cooling capacity: 2 x 3.0 kW
 Refrigerant: R134A ozone friendly
 Maximum outside temperature: 55 °C (131 °F)

PHOTOVOLTAIC SYSTEM

PV-Power: 4770 Wp
 Number of solar panels: 6 x 3 Panels
 Battery capacity: 229 Ah
 Self-sufficiency (100 % duty cycle): 6 h

PV UPGRADE 1

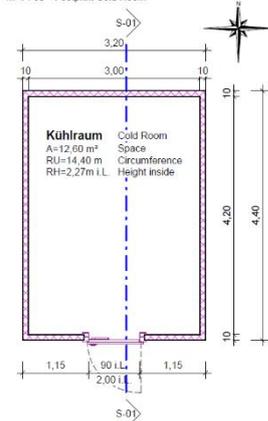
PV-Power: 9 540 Wp
 Number of solar panels: 12 x 3 panels
 Battery capacity: 916 Ah
 Self-sufficiency (100 % duty cycle): 12 h

PV UPGRADE 2

PV-Power: 13 515 Wp
 Number of solar panels: 23 x 3 panels
 Battery capacity: 1375 Ah
 Self-sufficiency (100 % duty cycle): 24 h

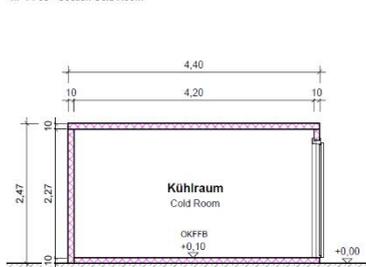
G-01 Grundriss Kühlraum

M 1 : 50 Footprint Cold Room



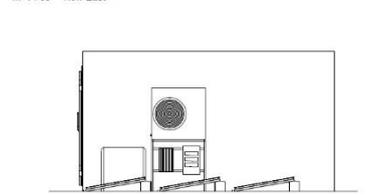
S-01 Schnitt Kühlraum

M 1 : 50 Section Cold Room



Ansicht Osten

M 1 : 50 View East



Ansicht Süden

M 1 : 50 View South



Alle Maße sind vor Ort zu prüfen!!!

Plan Gesamtplan Kühlraum		 KRAMER KRAMER GmbH Stöckmatten 2 · 10 D-79224 Umkirch Telefon 076 65 / 93 99-0 Telefax 076 65 / 93 99-199 info@kramer-freiburg.com		
Projekt: Cellux				
M: 1:50	Datum: 09.12.20	Zeichner: LB	Geprüft: MW	Plancode: G-01
Form: A3	Entwurf, Idee und Form sind urheberrechtlich geschützt und dürfen ohne Zusage nicht weiterverwendet werden.			

CELLUX for farmers and cooperatives: a significant enhancement of revenue through better quality and higher quantity of fresh produce



The price of the farm produce is determined by its quality which on the hand is depended on how these produce is stored after harvesting. The vulnerability of products like fruits and vegetables, not forgetting also milk and meat is greatly improved when stored in cool and dry places where contamination from pests of all kinds or excessive heat is excluded.

The solar-powered CELLUX cooling chamber as the name suggests provides the perfect solution for farmers most especially in Africa. The cooling unit has a volume capacity to serve as storage facility for cooperatives. Vulnerable farm produce can now be stored longer after harvesting and batch-marketed by the cooperative itself hence maximizing the returns for all the members. The cost of the solar-powered CELLUX cooling unit is so considerable that the farmers can be able amortize within a quite short period approximately 3 years.

In addition to that, CELLUX eradicates the obstacles of price manipulation that is imposed on the small scale farmers by the brokers or the other wholesale buyers. By forming cooperatives, farmers can regulate the purchasing and selling of their crops in order to improve their agricultural profitability. Through these cooperatives, the farmers have a potential for making better negotiations for their products in unison and hence making better sales. In addition, professionally managed marketing of the farm produce through the cooperatives will curb the exploitation which could come about when the small scale farmers struggle with the marketing of their products individually.

- **Enables farmers to store vulnerable products for a longer period**
- **They can sell bigger quantities, better quality and get better prices**
- **It frees farmers from price manipulation imposed by brokers and wholesalers**
- **Extra storage capacities can be rented, providing another viable source of revenue**

CELLUX for investors: social entrepreneurship and a sustainable business model



CELLUX also offers a viable business model for investors who actively support sustainable development in Africa, and want earn money with a clear conscience! The CELLUX cooling chamber has a volume capacity that provides enough room and space to store a considerably large amount of farm produce. With this kind of a cooling facility as a business model, any investor be it a farmer or not could buy the CELLUX cooling chamber and rent the cooling space to the other small scale farmers. In a nut shell therefore, the key to early amortization of the cold store lies in the rental of crates and per day.

Some farmers might not have the produce capacity to fill up the whole chamber and therefore just require a small fraction of the space for some limited period of time. These farmers or might be local market sellers are charged for the space occupied in terms of the number of crates they have stored in the CELLUX cooling chamber. An example of a fee charge in this case is for instance, the person in question can be offered the use of the cold store for a fee of 50 Ksh per day and crate.

CELLUX S costs of configuration is approximated at around 4 million Ksh; the costs of transport in Kenya and constructions (housing, concrete slab) excluded. Note that the cooling chamber can cool for 24 hours a day. Even with only 1,5 million Ksh turnover per year, the investor has his/her ROI in an approximated period of maximum 30 months and will generate a continuous income from it for many more years to come. The first battery service is due after 7 years.

- **Renting the cooling space by using crates is a simple yet sustainable business model**
- **CELLUX is available in 2 sizes: S which can contain up to 240 crates, L up to 400 crates**
- **1 crate of 50 x 50 x 50 cm for 50 KSH per day, would translate into 10 000 KSH per day if 200 crates are being rented**
- **Renting space to farmers for 300 days per year would generate 3 M Ksh turnover**

Case study: higher profitability for the Muuo Farm in Kithimani with CELLUX

This plan focuses on two different aspects of benefits derived from the use of the CELLUX cooling Chamber. However, these benefits should be perceived from two angles.

The direct benefits of owning a CELLUX cooling chamber to a farmer who owns 4.14 hectares, which corresponds to approximately 25 acres of 4,030 m². The farmer practices a mixed crop production of locally marketable fruits and vegetables on a cultivatable area of approximately 20 acres. The crops grown are fruits and vegetables such as bananas, oranges, mangoes, papaya, tomatoes, peppers, lentils, corn. The return on investments for this farmer is roughly enough for an upkeep for him and his family and this is done time and again!

Fruits and vegetables like avocados, French beans, Okra, and snow-peas could equally perform very well in this farm but are delicate and need a lot of attention most especially at the harvesting level. For the international markets, fruits and vegetable must be of impeccable quality i.e. freshness and hygiene is uncompromised to ensure that they fetch good prices when sold.

The following analysis illustrates the achievable (additional) yields using the CELLUX S, in a period of 12 months.

Reduction of crop losses due to spoilage or lack of ready market:

We have considered only three different aspects that contribute to the loss - the quality of the fruit whether fresh or not fresh, hygiene and the pressure to sell cheaper due to the threat of total loss.

Refrigeration keeps the harvested vegetables fresher and hygienic for a longer period, allowing them to be sold in a better condition or quality grade. In addition, several days' harvests can be collected and sold at a better price to an exporter who would not travel to Kithimani for a smaller quantity.

In the following example, we consider the yield that can theoretically be obtained and the yield that is obtained from an acre of land on which two different types of crops are grown in succession.

For example, in 2019, French beans (green beans) were grown as the first crop on one acre (approximately 4,030 m²). The investment (preparation of the field for sowing, fertilizer, manual labor for sowing and weeding) was 60,000 KSH. The planned/hoped yield was 4,000 kg (i.e., about 1 ton of beans per 1,000 m²), but ultimately only 2,585 kg were harvested, of which 785 kg were unsalable due to spoilage.

The hoped-for price per kg was 100 KSH; however, only 50 KSH per kg were achieved, due to less-than-optimal quality and the resulting pressure to sell the beans as quickly as possible.

The sales revenue was therefore only 90,000 KSH. When you subtract the cost of investment, a 30,000 KSH profit was obtained. If the harvested 2,585 kg of optimum quality could have been sold at 100 KSH, a profit of 198,500 KSH would have been realized.

On this second analysis, the farmer decided to plant capsicum. The crop was less demanding considering the time and machinery that was needed to prepare the field as compared to green beans. The investment done was, preparation of the field for sowing, fertilizer, and manual labor for sowing and weeding for only 30,000 KSH. However, both yields per acre and market prices per kg were lower than French beans (green beans).

The planned/hoped yield was 2,500 kg, but only 1,950 kg were ultimately harvested, of which 450 kg were unsalable due to spoilage (capsicum is also extremely sensitive to heat).

The maximum price to be achieved per kg was 60 KSH; however, only 40 KSH per kg were achieved. The sales revenue was therefore only 90,000 KSH; minus the investments, a profit of 30,000 KSH was achieved. If the harvested 1,950 kg could have been sold in optimal quality at 60 KSH, a profit of 87,000 KSH would have been achieved. Due to the bad experience and the losses incurred during these two incidences, the farmer quit cultivation of French beans and capsicum.

New ventures into cultivation opportunities of sensitive crops with higher returns.

Thanks to CELLUX, more profitable vegetables can be cultivated and well stored without the fear of spoilage. This in return will result to expansion of crop production as well as better returns on the crops produced. Here is an interesting study on French Beans Farming in the Nairobi area: https://www.actahort.org/books/158/158_53.htm

2. Renting the cold storage room to neighboring farmers or to traders

The unused volume of CELLUX S can be rented to other users according to the principle "50 KSH per box per day", this means additional income.

CELLUX S offers about 30 m³ volume in which 5 tons of fresh products can be stored. The MUUO farm can use an average of 60% of this. CELLUX sun-cooling system can be organized in stackable plastic crates with dimensions of 50 x 50 x 50 cm (i.e. with a volume of 0.25 m³) so that practically no space is lost. Theoretically, 240 crates fit into the cold store – but for easier movement we encourage 200 crates.

This means that a maximum of 80 crates can be rented out on a monthly average, which at a rental price of 50 KSH per crate and 24 hours would generate a maximum achievable annual revenue of 1,460,000 KSH. Assuming an average occupancy rate of 70%, we arrive at a realistic revenue of 1,022,000 KSH.

Crop	Harvest/kg per/Acre	Loss	Cost of Invest.	Price Max. per kg (KSH)	Price Real per Kg Ksh	Projected harvest (Ksh)	Real harvest Ksh	Real Loss Ksh
1.French Beans	2585	785	60000	100	50	198500	30000	168500
2.Paprika	1950	450	30000	60	40	87000	30000	57000
Total	4535	1235	90000			285500	60000	225500
Renting Cellux S	Crates 30m ³	Self-use Crates	Rented crates	Price per crate Ksh 24 hrs	Income max. 12 months	∅ occupancy rate 12 months in %	Personnel cost per year	Real profit
	200	120	80	50	1460000	70	110800	911200

The bigger picture

There are considerably more other direct and indirect benefits that come in handy through the use of CELLUX sun cooling like for instance, as an alternative way to electricity which is still a privilege to many Sub-Saharan region and its environments. The use of solar in these areas particularly in the food preservation would contribute hugely to mitigate struggles of food and financial insecurity.

The goal of the MUUO farm is to establish an efficient, organic agriculture and to market the products locally as well as internationally.

Organic food is also increasingly in demand in Kenya and is correspondingly well paid. We met the director of the Kenyan Institute of Organic Farming, <https://www.kiof.net/>, personally on our trip in July. He emphasized to the groups of the farmers present then, the importance of organic farming in maintaining the soil sustainability and also health improvement of the people themselves.

Through direct marketing, much higher yields can be achieved than through brokers who have so far taken the lion's share of the profits. The capital Nairobi is about 2 hours by car from the farm; with a small delivery truck with integrated refrigeration, supermarkets (cf. the initiative of Carrefour, <https://www.farmbizafrika.com/markets/1944-international-supermarket-launches-campaign-to-buy-avocados-tomatoes-watermelons-and-vegetables-from-local-farmers>) could be supplied directly.

CELLUX SOLAR POWERED COLD STORE



The construction of the CELLUX pilot plant in Kithimani, September 2021

The Muuo Farm is located in a small village called Kithimani on the A3 highway leading west from Nairobi. The farm is about 10 hectares. Before the pilot plant was set up, a number of preparations had to be made: For example, the access road was re-graded, a structure made of local natural stones was erected and a concrete slab had to be made for the installation of the solar panels.

For the opening event, a slope was terraced so that the tents could be set up. At the same time, parking space was created for the visitors' vehicles and a new toilet facility was built. These preparations took about 6 weeks, but thanks to the energetic efforts of the Muuo family, all the work was completed on time.



Concrete slab for the structure



Structure built of local natural stones



The CELLUX cold store comes in parts, which can easily be assembled by 2 persons within 6 hours



CELLUX SOLAR POWERED COLD STORE



Installation and wiring of the 12 solar panels which will ensure 100 % grid independency

Press Release

Official launch of the first CELLUX fully solar powered cooling chamber in Africa

Opening of the CELLUX pilot plant on the Muuo farm in Kithimani / Yatta

On 9th and 10th of October, more than 200 farmers, cooperative managers, representatives from different governmental institutions, county services, fresh produce exporters and managers from fruit and vegetable processing plants participated in the official launch of the first fully solar powered CELLUX cooling chamber in Kithimani / Yatta. The pilot plant allows to store 5 tons of fresh produce at a temperature of 6°C and will enable the German manufacturer suncooling to demonstrate the functionality and the use of CELLUX on a day to day basis in a region close to the Equator.



Participants waiting for the guided visit of the CELLUX pilot plant in Kithimani / Yatta

*“The CELLUX project in Kenia means a lot to **KRAMER** and **suncooling** and especially to me and my son. We focused more on idealistic than on economic targets. Due to the heat and the lack of cooling, billions of tons of agricultural products are spoiled every year. The solar powered cooling unit CELLUX provides a simple yet efficient solution to this problem. It needs no extra grid connection and can be installed almost everywhere, even in very remote areas. Due to its modular construction, a lot of parts can be sourced or produced in the country where it is used. I hope that this event will inspire a lot of discussion about the ways to fight post-harvest losses and that CELLUX will prove to be a viable solution towards more sustainable farming in Africa”*, related **Matthias Weckesser** in a video message, since he was not able to attend the launch due to the deteriorating Corona situation in Europe. He thanked the German government and especially the **German Ministry of Economic Affairs and Energy** as well as the **German Energy Agency dena** for their organizational and financial support. The project has been locally supported and implemented by **Logicool Ltd** (technical consulting and installation) and **Eurocomm Tekbiz Africa Ltd** (marketing and sales management). Both companies are based in Nairobi.

CELLUX SOLAR POWERED COLD STORE

In the video message of the **dena**, their representative **Sophie Heitz** also regretted not being able to attend the launch of the CELLUX pilot plant and emphasized the importance of this first project in Kenya: *“At the heart of the decision of dena to support this project lies the conviction that it could solve many problems at once. It allows the cooling of agricultural produce in off-grid regions without the use of fossil energy, it reduces agricultural waste and the loss of quality and should also rebalance the negotiations between farmers and brokers. We hope that suncooling and their local partners Logicool and Eurocomm Tekbiz Africa will be able to replicate this success in many more farms and cooperatives so that CELLUX can bring its benefits to a lot of people in Kenya.”*



Installation of the 12 solar panels which will ensure the off-grid function of CELLUX day and night

Joseph Muuo, farmer and owner of the first CELLUX pilot plant, emphasized the utility of the cooling chamber for him and the neighboring community. *“As farmers, we are passionate about what we are doing but get discouraged from intensive agriculture due to continued post-harvest losses. Sometime, I have been avoiding to harvest my ready fresh produce crop as I had nowhere to store it ahead of the market day. Thanks to the CELLUX cooling system, I will be comfortably harvesting my ready crop, and preserving it as I await for selling. In addition to that, the government is rehabilitating the Yatta Farrow and digging boreholes at Yatta Plateau. This means we will have more water for irrigation, thus, production will be higher. With a cooling unit in place, we will farm with more confidence.”*

Newton Matope, President of BigCold, a logistics company providing sophisticated cold chain solutions across East Africa from their anchor facility in Nairobi, Kenya, highlighted the necessity of cooling solutions for the quality of fresh produce. *“BigCold is one of the leading logistic partners for exporters of high quality fruits and vegetables from Kenya, like avocados, mangos and French beans. The lack of proper cooling facilities after harvesting has a huge negative impact on the quality of those farm products and though on the revenue of the farmers. We believe that the launch of the CELLUX solar powered cooling chamber will help to improve this situation for the good of all.”*

CELLUX SOLAR POWERED COLD STORE

A significant enhancement of revenue for farmers and a sustainable business model for investors

In fact, farmers will benefit from the use of CELLUX in several ways: It enables them to store vulnerable products for a longer period so that they can sell bigger quantities, better quality and get better prices. It will also mitigate the exposure of farmers to price manipulation imposed by brokers and wholesalers. In addition to that, extra storage capacities can be rented, providing another viable source of revenue.

CELLUX can also be a sustainable business model for social entrepreneurship. CELLUX is available in 2 sizes: S which can contain up to 240 crates, L up to 400 crates. By renting 1 crate of approx. 50 x 50 x 50 cm for 25 KSH per day in a CELLUX S would translate into a revenue of 5 000 KSH per day and generate a turnover of 1.5 M KSH per year (300 days).



Visiting the cooling chamber in small groups after the official opening by Bishop Dr. Titus Masika

CELLUX SOLAR POWERED COLD STORE



More than 200 people attended the launch of the CELLUX power plant



Meet the CELLUX cold store: PU sandwich panels, chiller, charge control and battery

CELLUX SOLAR POWERED COLD STORE



Media coverage

The opening event has been covered by two TV channels (KTN, Inooro) and 5 radio stations (Mbaitu FM, County FM, Sangu FM, Musyi FM and Athiani FM) which have broadcasted the information in Swahili, Kikuyu, Kamba and in English language. In the following weeks, the 3 big newspapers Daily Nation, The Standard and The Star also published articles about the launch of the CELLUX pilot plant in Kithimani, both print and online. There also have been publications in special interest magazines like HortiDaily, Smart Farmer Kenya, Kilimo Kwanza and Fresh Plaza.



CELLUX SOLAR POWERED COLD STORE



<https://www.youtube.com/watch?v=XPi8VAFzpT4&feature=youtu.be>



<https://www.youtube.com/watch?v=lbKq6Z1EX5I&feature=youtu.be>



<https://www.youtube.com/watch?v=p1VrcfypSbs&feature=youtu.be>



Seeds of Gold

Storage

BY PIUS MAUNDU

The peak fruit or vegetable season normally brings joy and pain to farmers and traders alike.

Not only do prices plunge due to high supply but losses and wastage arise due to lack of proper storage facilities and failure to add value to the produce.

Manipon, bananas, potatoes, oranges and tomatoes are some of the produce farmers lose in large quantities after harvest, especially when there is a glut in the market.

Fish and meat traders also suffer losses for lack of good storage. In Ukambani, one of the biggest sources of fruits like mangoes, oranges and pineapples, farmers and traders know too well the pain of lack of cold-chain facilities.

For years, many people have regarded it as a problem, but for Joseph Musau, who is based in Kithimani, along the Thika-Garissa highway the challenge has offered him a good business opportunity.

Musau has eased the traders' pain of losing their un sold stocks by offering cold storage services at a fee in a business model that can be replicated across the country to stem losses.

"Mine is a solar-powered cold room that holds up to eight tonnes of produce at a time," says the farmer, who, like others in the region, grows ba-

The business of storing farm produce

In many markets and farms across the country, tonnes of produce go to waste due to lack of proper storage facilities. Well, there is a huge business opportunity that lies untapped, namely offering storage services to traders and farmers at a fee, as Joseph Musau shows



QUALITY

1 A good solar cooling system lowers the energy at the cooling chamber within the shortest time possible, says Wanjala Nasrembe, the head of the agricultural mechanisation research programme at the Kenya Agriculture and Livestock Research Organisation.

2 To avoid denting the pockets of the benefactor, the cooling system should also use as little energy as possible, he adds.

3 To attain these qualities, a good solar cooling system should come with an effective insulation.

With cold room services, farmers stand a better chance of sustaining their deals. This way, cold rooms give farmers an opportunity to reap more from their produce.

Dr Jane Ambuko, UoK

nanas, capsicum, eggplants, tomatoes, squash, okra and assorted vegetables along the Yatta Canal.

"The Sh3.5 million cold room helps extend the shelf-life of fresh produce by at least six weeks.

"This has translated to increased profits since we store the produce for long as we look for good markets," Musau tells the *Seeds of Gold*.

He started the business some three months ago after receiving the equipment from his daughter, Rachael Mwendu who is based in Germany.

"My father has been growing crops on a small portion of his 25 acres yet it is next to the Yatta Canal. He has not been keen on expanding the enterprise because of losses associated with lack of a faster market. We invested in the cold room to stem losses at home and in the region and generate income," Mwendu says.

During the day, the cold room is powered directly by solar energy which also charges batteries that hold power for night cooling.

"This means cooling of the produce

happens during the day and at night," says Charles Kagiri, a technician at Logicool, which installed the gadget, noting the solar panels generate 48 volts of direct current.

Musau, a former trade unionist, charges traders and farmers using the cooler to store their fresh produce Sh10 per crate per day. He says the equipment can serve up to 500 farmers during the peak season.

If one cannot afford the Sh3.5 million cooler, there are other options, including a charcoal cooler.

"The cooler is made by filling the walls of a specialised cooling compartment with charcoal and periodically watering it.

"The idea is to trigger the conversion of the water to vapour, a process which uses the energy in the cooling chamber.

"The evaporation of water from the charcoal walls tap the heat in the local environment and creates a cooling effect in the cooling chamber which keeps fresh produce for long," says Wanjala Nasrembe, the head of the ag-

ricultural mechanisation research programme at the Kenya Agriculture and Livestock Research Organisation.

Dr Jane Ambuko, a post-harvest loss management expert who teaches at the University of Nairobi, says extending the shelf life of fresh produce through refrigeration significantly reduces post-harvest losses.

"With cold room services, farmers stand better chances of sustaining their deals. This way, cold rooms give farmers an opportunity to reap more from their produce," she says.

She notes that cold chain facilities enable farmers and traders to slow down the deterioration of fresh fruits and vegetables while preserving the quality of fresh produce.

Musau relies on word of mouth and referrals from traders and farmers to advertise his services.

To sustain and grow the business, he allows those without the required fees to pay once they sell their produce.

"The company that installed the plant has trained a team of local

youths to maintain certain aspects of the cooling facility. They know how to clean the solar panels periodically using water," says Kagiri.

The government does not tax farmers who operate cold-storage facilities for personal purposes.

However, when the services are commercialised, one needs a trading licence from the county government, among others.

In Kithimani, vendors of fruits and vegetables are expected to make more profits as farmers who grow highly perishable crops along the Yatta Canal double their efforts now that post-harvest losses are a thing of the past.

The Kenya Plant Health Inspectorate Services notes that more than 40 per cent of the fresh produce in the country goes to waste after harvest. The post-harvest losses are more magnified in drylands where the produce faces the double whammy of pests and drought.

Joseph Musau arranges tomatoes in a solar-powered cold room in Kithimani village, Machakos County. PIUS MAUNDU/NATION

satnation@ke.nationmedia.com

Publication in Daily Nation on 5th December 2020

Innovation

Ask the Vet

Cold room comes to the rescue of farmers

Kithimani Solar Cooling plant can hold eight tonnes of fresh produce and keeps it fresh for almost a month.

By Stephen Nzoka
snzoka@standardmedia.co.ke

It is a hot Friday evening at Kithimani and farmers are strategically positioned along the Machakos-Nairobi-Garissa intersection where there is a fresh produce market.

The traders have various produce including tomatoes, green maize, bananas, chili and French beans.

Majority of them belong to Matuu Farmers Self-Help group and have been farming commercially for years, using water from Yatta canal.

They sell their produce to "Go For Green (K) Limited" which exports them to the United Kingdom and Germany.

Given that the farmers deal with highly perishable produce and the area is relatively hot, for years, they suffered heavy post-harvest losses because they lacked cold room storage facilities.

gamechanger

"I get an average of 30 kilograms of okra from a quarter of an acre, and 150 kilograms of valoro from an acre.

"However, almost half used to go to waste due to lack of cold storage systems. But now we are sorted out," says Phillip Muange, a farmer at Kondo village.

Muange and hundreds of farmers now have access to a cold room storage facility courtesy of a German company. "The heat in this semi-arid area makes our farm produce go bad very fast. Many a time, we have delivered our produce to Go For Green (K) Limited, but it was rejected because it had started rotting. We suffered millions of post-harvest losses in the past," Muange says.

But the post-harvest losses will be a thing of the past, thanks to Kithimani Solar Cooling plant initiated by Logicool Limited and co-financed by the German government.

Many farmers now have a place to store fresh produce at no extra cost.

Zacharia Mwaka, 62, grows French beans on his 2-acre piece of land, is one of the cold room users.

He says, before the cold room was set up, farmers would lose 45 per cent of their produce.

The loss would happen due



Farmers from Kithimani in Machakos County place their tomatoes in the solar-powered cold room. [Stephen Nzoka, Standard]



Joseph Muuo at his banana farm in Yatta, Machakos County. He is also a beneficiary of the cold room.

to rotting and during transportation. They now put their produce in crates to avoid breakages.

Charles Kagiri, director at Logicool Limited, says they erected the plant to help farmers cut down on the post-harvest losses that eat into their profits.

"Our aim is to reach farmers who are not covered by grid power to make sure we curb massive post-harvest losses the farmers have been experiencing," Kagiri says.

Kagiri describes the technology as eco-friendly and saves farmers maintenance costs. The batteries that can last for up to eight years store energy for use at night and on cold days.

"This cold room is solar-powered, whereby the photovoltaic panels are customised to generate 48 volts of direct current. There being no power conversion to alternating cur-

rent, this reduces power loss by 99 per cent.

"During the day, the cold room is powered directly by these photovoltaic panels and at the same time, charging the 8 batteries which have the capacity to hold power for eight hours without the sun.

"This means that during the night we have enough power to run the cold room," Kagiri explains.

Extend shelf life

The cold room can hold eight tonnes of fresh produce at 80 per cent loading. It has LED lighting which cuts heat emissions, thus maintaining the low temperatures needed to keep produce farm fresh.

The temperature inside are minus degrees centigrade with 90 per cent moisture content which covers most vegetables and fruits therefore extending the shelf life.

Joseph Muuo, a banana and

About coldroom

The Coldroom is solar-powered, whereby the photovoltaic panels are customised to generate 48 volts of direct current which is consumed by the machine.

There being no power conversion to alternating current, this reduces power loss by 99 per cent. During the day, the coldroom is powered directly by photovoltaic panels and at the same time, charging the 8 batteries which have the capacity to hold power for eight hours without the sun. This means that during the night there is enough power to run the coldroom.

The plant can hold eight tonnes of fresh produce at a go.

fruit farmer says the cold room is a profit booster as it helps him keep his produce fresh for longer giving him ample time to search for market. With the cold room, farmers are able to increase the shelf life of fruits and vegetables by up to 21 days.

"Now that the issue of storage is sorted out, we have time to concentrate on looking for better prices," says Muuo who grows tissue culture bananas in Kalelani.

The farmers plan to diversify to new crops that have high value now that post-harvest losses have been addressed.

Why you must get it right with poultry vaccination



DR WATSON MESSO

Hallo dakari, I keep layer chicks and I have a query. On the vaccination programme, can I skip injectable vaccines? What are the consequences and is there an alternative to this method of administration? [Steve]

Dear Steve, I need to state some facts clearly. Poultry vaccination is an important activity in flock health management. It works hand in hand with farm biosecurity, hygiene and sanitation.

Layer farmers who have been vaccinating their chicks against local diseases know benefits of this procedure in the event of a disease outbreak. Therefore, all poultry farmers should vaccinate their flocks to protect them from diseases such as Gumboro, Newcastle, Fowl Typhoid, Fowl pox and Infectious Bronchitis. In my years of avian medicine, I still strongly believe that poor vaccine administration is the major cause of vaccine failure.

All vaccination programmes are designed with the following in mind: understanding on the disease challenges, type of bird, type of vaccine and the best method to administer it. Vaccines can either be live or killed. Live vaccines are biological products produced from disease causing organism and if applied to healthy flocks' results into development of immunity against that disease. Most live vaccines are administered through drinking water, spray or nasal or eye drop. They are cheap, provide short term immunity, applicable against mainly respiratory diseases and if not properly given can cause severe reactions. The killed vaccines on the other hand are mainly injectables, they produce long lasting immunity and are administered as a second vaccine after a live priming vaccine. They are administered to long living birds. Here are five methods of vaccine administration in poultry.



A farmer vaccinates his chicks. Experts recommend strict adherence to vaccination.

Drinking water method

Vaccines administered through this method are mainly live in nature. The birds must be thirsted for 1-2 hours and the vaccine water must be free from heavy metals. You can mix 2grams of skimmed milk in one litre of water to protect the vaccines. Gumboro vaccines are administered through this method.

Spray Vaccination

This technique should be done for birds ranging between 11 days to 6 months. It requires a special spray gun that can deliver uniform droplets of water in a band approximately three metres in front. You need to use cool, fresh distilled water and the spray targets the upper respiratory tract. It is used for Newcastle and Infectious bronchitis live vaccines. It is also commonly used in hatcheries to vaccinate day-old chicks.

Eye-drop Technique

This procedure is most effective way to deliver vaccines against respiratory diseases like Newcastle and Infectious bronchitis. It is labour intensive as you must handle every chick and using a provided dropper, apply vaccine in either the eye or nasal opening.

Wing web stab

This method involves use of a two-prong applicator that is dipped in the vaccine then used to puncture the wing web of chickens. The method is specifically good for application against Fowl pox disease. The operator must be trained to avoid the vaccine spilling on the eyes and beaks of the vaccinated chickens.

Injection of vaccines

This can be injected deep into muscles of the leg, breast or thigh. It can also be injected subcutaneously below the skin in the neck region depending on the type of vaccine. The vaccines used in this method are mainly killed type and is done in long living birds like layers or breeders. The vaccines used include Fowl typhoid, Mycoplasma, Coryza and Fowl cholera. Hygiene, knowledge and experience are critical when applying this method. The applicator must be thoroughly washed and steamed before and after use. The needle should be of the right gauge and length. This sort of application is mainly administered by qualified veterinary surgeons or para veterinarians.

Finally, failure to vaccinate your flocks puts them in danger in the event of disease outbreak. There is no vaccine given through feed.

[vet@kenchic.com]

Publication in The Standard on 24th October 2020

NEWS GENERAL



Rachel Bleyer of Eurocomm Tekbiz Africa hands over the keys to the Cellux Cooling Chamber to Mzee Joseph Muuo and his wife

/ LOISE MACHARIA

AGRICULTURE

Horticultural farmers from Machakos get cooling plant

This will save the 40 per cent of their produce that was going to waste

LOISE MACHARIA @TheStarKenya

Drought is a perennial problem in the dry counties of Machakos, Kitui, Makueni and other areas of Eastern Kenya.

However, residents still grow crops and ensure they remain productive. And in their efforts to remain food sufficient, the folks take advantage of the short, wet seasons and practice irrigation.

However, tough weather, unpredictable market, poor timing, which sometimes leads to glut, and the rugged terrain make their post-harvest losses higher compared to other regions in the country.

In Kithimani, Machakos county, a group of farmers irrigate their farms with water from a furrow dug by prisoners during the colonial times, while others have sunk boreholes to aid their farming.

To cut down on post-harvest losses, Stephan and Rachel Bleyer, a German-based couple, is installing a solar-powered cooling chamber.

"Unlike the common story that that this region is unproductive, there is a huge amount of produce coming from here especially fruits, vegetables, herbs and spices," Stephan said during the handing over of Sh3.5 million solar-powered Cellux cooling chamber to Joseph Muuo Farm in Kithimani.

Stephan said this will save the 40 per cent of their produce that was going bad.

"Cellux manufacturer, Suncooling and Kramer, donated 90 per cent of the cooling chamber after they heard about the farmer's plight, while Mzee Muuo offered a section of his farm to install it," he said. Muuo also paid Sh350,000 for the machine, which is 10 per cent of the total cost.

Stephan said they chose a machine that operates off-grid since there is no power supply in the area.

He added besides offering a place for farmers to safely store their produce, the cooling chamber will allow the community to aggregate and access common markets, thereby avoiding exploitation by brokers.

Rachel said such investments will help ensure food security in the counties and the country in general, while at the same time eradicating poverty.

"Horticultural produce spoils very fast after absorbing heat during harvest. But with a cooling facility, the vegetables, herbs and spices can be allowed time to cool-off and reduce post-harvest losses," she said.

Some locals who gathered at Muuo's home during the handing over event said they were on verge of abandoning horticulture due to huge losses.

Zachariah Mwaka said the installation of the cooling facility was timely. He grows bananas, French beans, eggplant, tomatoes and capsicum for export.

He urged the national and county government to install such facilities in other high horticultural producing semi-arid areas to cushion farmers from losses. Mwaka cited Mwala, Ithanga, Kangundo and Masinga areas where farmers suffer the same predicaments as those in Kithimani.

FOOD SECURITY

Word Bank gives seed subsidies

Initiative to alleviate hunger in the area, which receives erratic rains

KNA/ Farmers in Muthetheni and Miu locations have benefited from seed subsidies and fertiliser amounting to Sh10 million sponsored by the World Bank.

Under a programme dubbed Kenya Climate Smart Agriculture Project, the residents of the two locations in Mwala subcounty are being issued with green grams and cowpeas for planting. They can withstand dry weather conditions, thus promoting food security in the area.

Muthetheni location retired chief Isaac Muthini Ndei said those who wish to benefit from the initiative must first be registered in a self-help group for easier distribution of the farm inputs. He is the programme coordinator. Ndei said the initiative will alleviate hunger in the area, which receives erratic rains.

"At the tail end of this programme, we intend to have spent at least Sh10 million and hopefully manage to pull our people from the problem of perpetual hunger and poverty which has stalked them for years," he said.

On his part Muthetheni MCA Jeremiah Munguti called on area leaders not to politicise the project but support it for the benefit of the residents.

He said as a leader, he was fully behind the programme and would push for drilling of additional boreholes to boost irrigated farming.

"I fully support this programme and promise to push for the drilling of two bore holes within Muthetheni and Miu wards to help farmers in irrigating their farms. I, therefore, wish to urge those who have not yet joined any self-help group to do so to benefit from this project," he said.

In March this year, Machakos began a programme for campaigning for the uptake of modern farming techniques as one way of improving food production and addressing the effects of climate change.

Speaking in Muthetheni trading centre on March 3 during the launch of the Climate Smart Agriculture Project, Machakos Governor Alfred Mutua said the only way of creating wealth among the rural residents was by coming up with mechanisms that can boost farming activities by investing in modern technology.

He said the objective of launching the project was to empower farmers through self-help groups and pushing for innovation, technology as well as an improvement in management practices for better agricultural output.

Mutua said the county government had by then spent a total of Sh45 million in the first phase of the programme on help self-help groups involved in agriculture startups enterprises.

"We have so far invested Sh45 million in this inaugural phase of this program that will see self-help groups from Muthetheni, Katangi, Mwala, Kola, Masii and Ikombe receive grants for their startup agricultural enterprises," he said.

NEAR COLLAPSE

Fleeing Sacco members default on Sh1.5m loans

MUSEMBI NZENGU/ The Mwingi Traders Sacco in Kitui county is still afloat only by grace after a sizeable number of members abandoned it and defaulted on loans amounting to Sh1.5 million, an audit report shows.

Records indicate the Sacco had over 300 members when it started in 2011, but now has only 29 active members.

"Before the year 2019, the Sacco had grounded to zero and was on the verge of being auctioned. Members had deserted the Sacco and defaulted in loan repayment to the tune of Sh1,518,085," auditor Fredrick Matheka notes in a report covering the 2019 financial year.

He presented it to the members at a special AGM in Mwingi town on Saturday.

The report further notes that although at the time the Sacco had cumulative member shares of Sh2.5 million, the funds were not traceable.

Matheka said things started improving when a new board was elected into office on May 9, 2019.

The board mobilised some philanthropic members to salvage the situation by buying more shares and lending funds to the Sacco.

The Sacco was cited for having abandoned the saving and credit function for which it is licensed for.

Instead, it resorted to entirely engaging in hiring out a hearse, the report said, which is wrong.

Sacco chairman Joseph Kamonzoo said he assumed office when the society was on the verge of collapse.

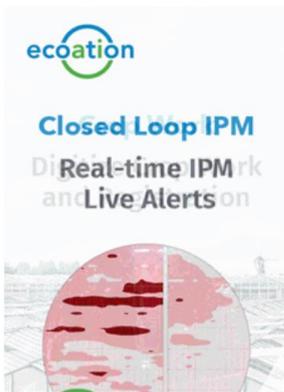


Mwingi Traders Sacco chairman Joseph Kamonzoo on Saturday / MUSEMBI NZENGU

Publication in The Star on 27th October 2020



SPEEDDOOR 



Kenyan growers in Machakos get a cooling facility

In the counties of Machakos, Kitui, Makueni and other areas of Eastern Kenya, drought remains a perennial problem. Farmers there still grow crops, taking advantage of the short, wet seasons. However, harsh weather and an unpredictable market can sometimes lead to a glut, and the rugged terrains make their post-harvest losses higher compared to other regions in the country.

To cut down on post-harvest losses, Stephan and Rachel Bleyer, a German-based couple, is installing a solar-powered cooling chamber. "Unlike the common story that that this region is unproductive, there is a huge amount of produce coming from here especially fruits, vegetables, herbs and spices," Stephan said during the handing over of solar-powered Cellux cooling chamber to Joseph Muuo Farm in Kithimani.



Stephan said this will save the 40 per cent of their produce that was going bad. "Cellux manufacturer, Suncooling and Kramer, donated 90 per cent of the cooling chamber after they heard about the farmer's plight, while Mzee Muuo offered a section of his farm to install it," he said.

Stephan said they chose a machine that operates off-grid since there is no power supply in the area. He added besides offering a place for farmers to safely store their produce, the cooling chamber will allow the community to aggregate and access common markets, thereby avoiding exploitation by brokers.

One grower said the installation of the cooling facility was timely. He grows bananas, French beans, eggplant, tomatoes and capsicum for export. He urged the national and county government to install such facilities in other high horticultural producing semi-arid areas to cushion farmers from losses.

Source: the-star.co.ke

Publication date: Thu 29 Oct 2020



FOOD SECURITY

Horticultural farmers in Machakos get a cooling chamber

Kithimani farmers gifted a cooling chamber

Eastern
27 October 2020 - 05:00

In Summary

- To cut down on post-harvest losses, Stephan and Rachel Bleyer, a German-based couple, is installing a solar powered cooling chamber.
- Stephan said this will the 40 percent of their produce that was going bad.



*REFRESH Kithimani residents at Joseph Muuo's farm during the handing over of Cellux cooling chamber. Muuo donated a piece of his land for the installation.
Image: LOISE MACHARIA*

Drought is a perennial problem in the dry counties of Machakos, Kitui, Makeni and other areas of Eastern Kenya.

However, residents still grow crops and ensure they remain productive. And in their efforts to remain food sufficient, the folks take advantage of the short, wet seasons and practice irrigation.

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Stephan said they chose a machine that operates off-grid since there is no power supply in the area.

He added besides offering a place for farmers to safely store their produce, the cooling chamber will allow the community to aggregate and access common markets, thereby avoiding exploitation by brokers.

Rachel said such investments will help ensure food security in the counties and the country in general, while at the same time eradicating poverty.

"Horticultural produce spoils very fast after absorbing heat during harvest. But with a cooling facility, the vegetables, herbs and spices can be allowed time to cool-off and reduce post-harvest losses," she said.

Some locals who gathered at Muuo's home during the handing over event said they were on verge of abandoning horticulture due to huge losses.

Zachariah Mwaka said the installation of the cooling facility was timely. He grows bananas, French beans, eggplant, tomatoes and capsicum for export.

He urged the national and county government to install such facilities in other high horticultural producing semi-arid areas to cushion farmers from losses.

Mwaka cited Mwala, Ithanga, Kangundo and Masinga areas where farmers were suffering the same predicaments as those in Kithimani.

"We appreciate this couple for gifting us with this facility but it has a capacity of holding slightly more than 40 tonnes of produce and cannot serve all the affected farmers in Kithimani alone, leave alone the other regions," he said.

Muuo said farmers in his locality were welcome to use the cooler on his farm and urged others to volunteer grounds for such installations in case a donor came by.

Edited by EKibibi



By Jackson Okata

Farmers in eastern Kenya will enjoy better prices for their fresh produce, thanks to a new solar-powered storage facility.

Located in Yatta constituency's Muuo Farm, Kithimani, the plant will reduce post-harvest losses and increase farmers' bargaining power for perishable products.

The Cellux cooling plant is the first of its kind in Africa and has a five-ton capacity. It can store fresh produce at six degrees centigrade.

The project was initiated through a partnership between the manufacturer Suncooling Inc and a German company, Kramer, which supervised the implementation.

Speaking at the launch, Mr Matthias Weckesser, from Kramer, called for discussions on ways to fight post-harvest losses. He also gave an assurance that the Cellux coolers would be a viable solution.

"Due to the heat and lack of cooling plants, billions of tons of agricultural products are lost annually. The unit provides a simple yet efficient solution, needs no extra grid connection and can be installed in very remote areas. Due to its modular construction, most parts can be sourced locally," he said.

The German Ministry of Economic Affairs and Energy as well as the German Energy Agency, Dena, provided organisational and financial support for the project.

Dena representative Sophie Heitz said the project could simultaneously solve many problems without the use of fossil fuel.

"It allows the cooling of agricultural produce in off-grid regions without the use of fossil energy, reduces agricultural waste and loss of quality and will rebalance the negotiations between farmers and brokers," she said.

Farmers' representative Joseph Muuo said the Cellux cooler would reduce post-harvest losses and encourage farmers to invest more in agriculture.

In addition to enabling farmers to store products for longer periods, it will reduce the price manipulation by brokers and wholesalers.

← → ↻ kilimokwanza.org/no-more-post-harvest-losses-kithimani-farmers-rejoice/

Improving the livelihood of small-scale farmers Agriculture; Developmental Communication

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No More post-harvest Losses, Kithimani farmers rejoice

News | October 25, 2020 | No Comments

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By Edwin Githinji

E-mail: eddy.githinji022@gmail.com

Worldwide, 1.3 billion of all the food produced for human consumption is lost, spoiled, or wasted. This observation is more vivid in developing countries, where the storage facilities are made of straw and wood.

This makes the harvest vulnerable to rain, infestation by rodents and insects, and insufficient cooling for temperature sensitive produce, an amount that if saved, would level up the status of food availability worldwide without requiring additional resources, or further harming the environment

Most of the counties located in eastern Kenya suffer the most from drought as a perennial problem. Compared to other counties where farming takes place, one would easily get convinced that this region is very unproductive. Even so, farmers of this region are more than ever before committed to ensure that by taking advantage of the short, wet seasons to grow crops, that narrative of unproductivity is completely thwarted.

To cut down the post-harvest losses that are incurred by these hardworking farmers, Stephan and Rachel Bleyer, a German based couple offered to put up and equip a solar-powered cooling plant.

"Unlike the common story that this region is unproductive, there is a huge amount of produce coming from here, especially fruits, vegetables, herbs and spices," Stephan said during the handing over of the Cellux cooling plant to Joseph Muuo Farm, in Kithimani.

"Were it not for the contribution no everyone who partnereda in the development of this project," said Stephan, "we wouldn't be here. Cellux manufacturer, Suncooling and Kramer, donated 90% of the cooling plant after they heard of the farmers plight, while Mzee Muuo offered a section of his land to install it," he said.

Stephan said they chose a machine that operates off-grid since there is no power supply in that area.

"Besides offering a place for farmers to safely store their produce," he added, "the cooling chamber will allow the community to aggregate and access a common market, thereby avoiding exploitation by brokers."

Rachel, on the other hand said that such investments will ensure food security in the counties and the country in general, while at the same time eradicating poverty.

At the event were the locals who, with smiley faces were not left behind in celebrating the blessing that this cooling plant would be to them.

Zachariah Mwaka who grows bananas, French beans, eggplant, tomatoes and capsicum for export said the installation of the cooling plant was timely, when they all in dire need for it.

He also urged the national and county governments to install similar facilities in other high horticultural producing semi-arid areas, so as to cushion farmers from the post-harvest losses they incur repeatedly.

"We appreciate this couple for gifting us this facility, which has a holding capacity of slightly more that 40 tonnes of produce, which cannot serve all the affected farmers in Kithimani only, let alone all the other regions," he said.

Mzee Muuo said farmers in his locality were welcome to use the cooling plant on his farm and urged others to volunteer grounds for such or even bigger installations, incase a donor came by.

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Kenyan growers in Machakos get a cooling facility

In the counties of Machakos, Kitui, Makueni and other areas of Eastern Kenya, drought remains a perennial problem. Farmers there still grow crops, taking advantage of the short, wet seasons. However, harsh weather and an unpredictable market can sometimes lead to a glut, and the rugged terrains make their post-harvest losses higher compared to other regions in the country.

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Source: the-star.co.ke



AgroFresh



AGRIFOOD marketing



The business of storing farm produce

Saturday, December 05, 2020



Joseph Musau inside his solar-powered cooling facility in Kithimani village, Machakos County; he has eased traders' pain of losing their unsold stocks by offering cold storage services at a fee. Pius Maundu | Nation Media Group



By Pius Maundu
Reporter
Nation Media Group

What you need to know:

- In many markets and farms across the country, tonnes of produce go to waste due to lack of proper storage facilities.
- There is a huge business opportunity that lies untapped, namely offering storage services to traders and farmers at a fee.
- The Kenya Plant Health Inspectorate Services notes that more than 40 per cent of the fresh produce in the country goes to waste after harvest.
- The post-harvest losses are more magnified in drylands where the produce faces the double whammy of pests and drought.

The peak fruit or vegetable season normally brings joy and pain to farmers and traders alike.

Not only do prices plunge due to high supply, but losses and wastage arise due to lack of proper storage facilities and failure to add value to the produce.

Mangoes, bananas, potatoes, oranges and tomatoes are some of the produce farmers lose in large quantities after harvest, especially when there is a glut in the market.

Fish and meat traders also suffer losses for lack of good storage. In Ukambani, one of the biggest sources of fruits like mangoes, oranges and pawpaws, farmers and traders know too well the pain of lack of cold-chain facilities.

For years, many people have regarded it as a problem, but for Joseph Musau, who is based in Kithimani, along the Thika-Garissa highway, the challenge has offered him a good business opportunity.

Musau has eased the traders' pain of losing their unsold stocks by offering cold storage services at a fee in a business model that can be replicated across the country to stem losses.

Extend shelf-life

"Mine is a solar-powered cold room that holds up to eight tonnes of produce at a time," says the farmer, who, like others in the region, grows bananas, capsicum, eggplants, tomatoes, squash, okra and assorted vegetables along the Yatta Canal.

The Sh3.5 million cold room helps extend the shelf-life of fresh produce by at least six weeks.

"This has translated to increased profits since we store the produce for long as we look for good markets," Musau tells the *Seeds of Gold*.

He started the business some three months ago after receiving the equipment from his daughter, Rachael Mwendu, who is based in Germany.

"My father has been growing crops on a small portion of his 25 acres yet it is next to the Yatta Canal. He has not been keen on expanding the enterprise because of losses associated with lack of a faster market. We invested in the cold room to stem losses at home and in the region and generate income," Mwendu says.

Solar energy

During the day, the cold room is powered directly by solar energy, which also charges batteries that hold power for night cooling.

"This means cooling of the produce happens during the day and at night," says Charles Kagiri, a technician at Logicool, which installed the gadget, noting the solar panels generate 48 volts of direct current.

Musau, a former trade unionist, charges traders and farmers using the cooler to store their fresh produce Sh10 per crate per day. He says the equipment can serve up to 500 farmers during the peak season.

If one cannot afford the Sh3.5 million cooler, there are other options, including a charcoal cooler.

"The cooler is made by filling the walls of a specialised cooling compartment with charcoal and periodically watering it.

"The idea is to trigger the conversion of the water to vapour, a process which uses the energy in the cooling chamber.

Better chances

"The evaporation of water from the charcoal walls tap the heat in the local environment and creates a cooling effect in the cooling chamber which keeps fresh produce for long," says Wanjala Nasirembe, the head of the agricultural mechanisation research programme at the Kenya Agriculture and Livestock Research Organisation.



Joseph Musau arranges tomatoes inside a solar-powered cold room in Kithimani village, Machakos County. The Sh3.5 million cold room helps extend the shelf-life of fresh produce by at least six weeks. Plus Maundu | Nation Media Group

Dr Jane Ambuko, a post-harvest loss management expert who teaches at the University of Nairobi, says extending the shelf life of fresh produce through refrigeration significantly reduces post-harvest losses.

"With cold room services, farmers stand better chances of sustaining their deals. This way, cold rooms give farmers an opportunity to reap more from their produce," she says.

She notes that cold chain facilities enable farmers and traders to slow down the deterioration of fresh fruits and vegetables while preserving the quality of fresh produce.

Musau relies on word of mouth and referrals from traders and farmers to advertise his services.

To sustain and grow the business, he allows those without the required fees to pay once they sell their produce.

Highly perishable crops

"The company that installed the plant has trained a team of local youths to maintain certain aspects of the cooling facility. They know how to clean the solar panels periodically using water," says Kagiri.

The government does not tax farmers who operate cold-storage facilities for personal purposes.

However, when the services are commercialised, one needs a trading licence from the county government, among others.

In Kithimani, vendors of fruits and vegetables are expected to make more profits as farmers who grow highly perishable crops along the Yatta Canal double their efforts now that post-harvest losses are a thing of the past.

The Kenya Plant Health Inspectorate Services notes that more than 40 per cent of the fresh produce in the country goes to waste after harvest.

The post-harvest losses are more magnified in drylands where the produce faces the double whammy of pests and drought.

CELLUX SOLAR POWERED COLD STORE



Project Partners:



The KRAMER company, which has its headquarters in Umkirch near Freiburg, Germany, has stood for experience and industry-encompassing innovation for more than 90 years in the areas of insulation technology, cold room construction and shop fitting. With more than 250 employees throughout Europe, KRAMER GmbH is one of the leading providers in the industry. The range of services in all business areas includes the entire value creation chain from planning to production, installation and also ready-for-use project completion. www.kramer-freiburg.com



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With more than 2,500 clients and almost 800 implementations, Logicool Ltd is the leading actor in Kenya in the field of cooling technology. Created in 2012 in Nairobi, it has been rebranded in 2017 and offers turnkey solutions for chillers/chiller rooms, evaporator units, air conditioning, mechanical ventilation and cold stores. Among their clients, there are big international brands like KFC, Kuehne + Nagel Group, Finlays and Subway. www.logicool.co.ke

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