CaaS

Cooling as a Service
Refresh the planet

Case Study

Off-grid cold storage for farmers in Kenya

SokoFresh offers farm level cold-storage as a service and a digital market linkage platform to seamlessly integrate small and medium scale farmers into professional value chains; reducing food spoilage and increasing the farmers' income by 30%.

Country/Region

Kenya

Sector

Agriculture, cold storage, refrigeration

Retrofit or new

New

Project Size (cooling equipment)

Refrigeration Unit Cooling Capacities (Watts):9496 watts

Technology

Solar Powered Cold Rooms

Refrigerant

R407F refrigerant

Partners

BASE

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SokoFresh

Overview

The need: SokoFresh's customers are mainly small-holder farmers who face challenges on all fronts when producing food for the country. They operate small and fragmented farms, often in difficult-to-access areas, making it hard for them to reach markets or market information, mainly as revenues and resources are insufficient to justify trips to the market to bring the crops there. As a result, most smallholder farmers are at the mercy of exploitative intermediaries who themselves do not have access to aggregation centers, cooling technologies, adequate packaging, or logistics solutions, resulting in 30-40% of the produce being spoiled before being sold to market. Unfortunately, this risk is entirely endured by the farmer, who only gets paid once all the losses of the intermediary have been accounted for. As a result, the farmer is often paid at a loss or for less than 60% of the harvest produced ; influencing negatively the cycle of poverty.

Smallholders are the dominant group in the agricultural sector of Kenya, accounting for 70%- 80% of farmers. Addressing the plight of the smallholder is therefore fundamental in promoting food security and transforming the country into a net exporter of food.

Investing in innovative sustainable food loss prevention systems is vital in producing enough food while ensuring good quality, higher incomes for the smallholder farmer, and preserving the environment.

The solution: Providing small holder farmers with access to Mobile, Solar Powered, 5MT cold rooms and a market. To meet the farmers' needs, Sokofresh (SF) delivers off-grid refrigerated cold rooms through Cooling as a Service for farmers to pay an affordable fee to access cold-storage rooms, in addition to receiving additional aggregation services, and market connection services. The fee is KES 1-2 /Kg/Day ($0.02) for farmers that have transport means and access to the market. For smallholders that do not have access to the market, SokoFresh offers the possibility of market linkage services, in which case the price of the service includes the storage and transport costs.

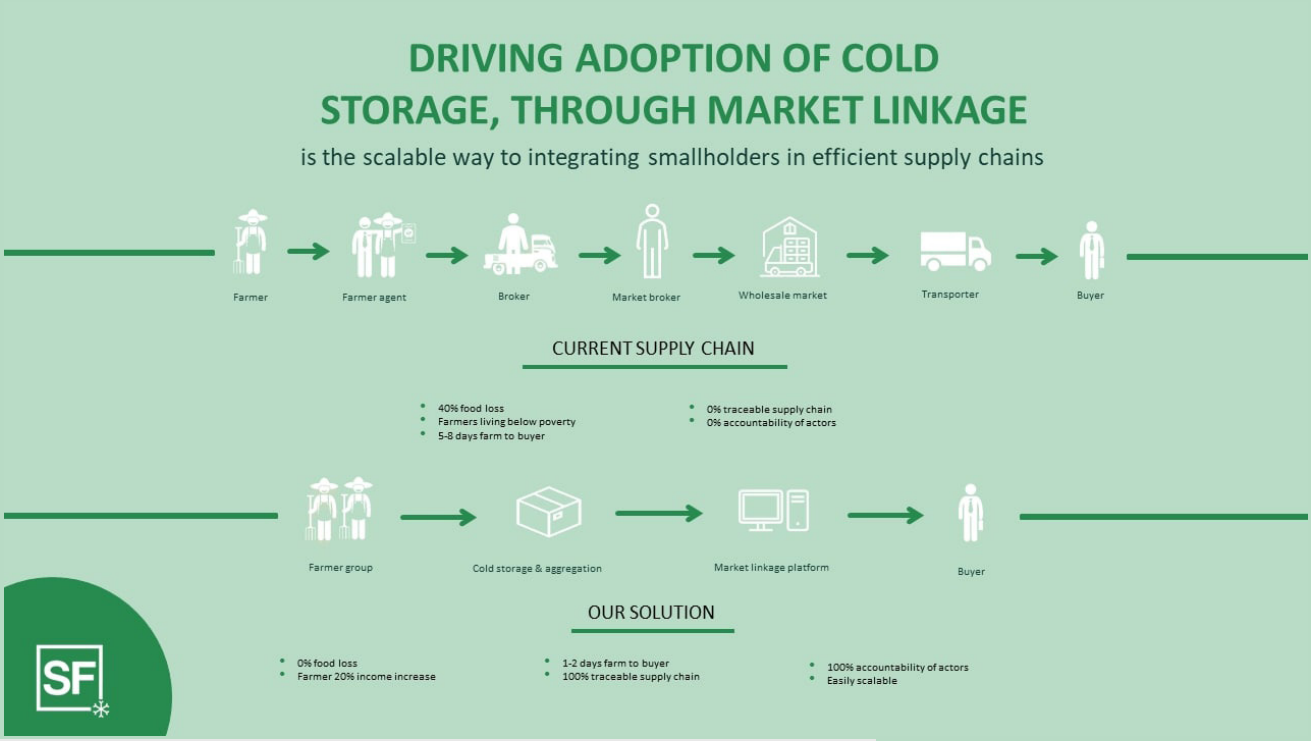
At the core of SokoFresh's offering is an off-grid solar-powered, mobile, cold storage solution. The units target specific value chains (avocados, bananas, mangoes and french beans) in rural area during harvesting season. Once the particular harvesting season is over, the cold storage is transported to a different location to harvest another crop, ensuring optimal utilization.

Sokofresh stays the owner of the cold room and ensures proper maintenance through its local employees. A video of the solution can be viewed **hereby**.

'We are now earning more since losses are minimized through cold storage services offered by SokoFresh. What's more, the service is always available whenever we need them."

- James Githinji, Avocado farmer

Green Bananas in cold storage.



High level overview of the SokoFresh business model

Benefits

Through Cooling as a Service, SokoFresh focuses on delivering climate-smart innovations to rural communities by making these accessible and affordable. SokoFresh introduced several services which contribute to reducing food loss: Storing produce in a temperature-controlled environment immediately after harvesting, sourcing premium markets for all crops harvested and introducing efficient transport logistics (goods are transported to markets in the evening when the temperatures are lower; minimising the degradation of the crops), and off taking 2nd grade produce from farmers for value addition. Not only does this interlinked approach save resources and improves food security overall - the direct benefits for SokoFresh clients, the smallholder farmer, are significant:

Socio-Economic Impact / Improved Livelihoods

Through SokoFresh's services, increase the farmers' income by up to 40% on average. This is the result of significant post-harvest loss reductions due to farm-level cold storage, but as well thanks to market linkage activities, through which SokoFresh enables access to off-takers for all of the produce from the farmer, thereby ensuring that the farmers have a market for their produce; which also supports them to obtain a fairer price for their crops.

Beyond the above, SokoFresh also creates new jobs through its activities at the farm level.

At the grassroots level, SokoFresh already offered seasonal jobs to over 50 harvesters and 9 agents. Gender inclusion being a priority to SokoFresh, so far 300 women farmer leads/ agents have been benefitting from the service and 700 men.

Environmental impact

The use of off grid solar energy combined with thermal storage to power the cold units eliminates the need for diesel generators and significantly reduces the size of batterypack; this significantly offsets amounts of CO2eq and also delivers financial benefits through lower operating costs. Furthermore, being independent from the grid and from diesel generators enables the cold-rooms to be placed in remote areas, truly reaching the last mile where food spoilage occurs.

Reducing post-harvest food loss also significantly impacts the amount of GHG released into the atmosphere, as well as ensuring that other valuable resources are not gone to waste. By avoiding crops end-up in landfill, significant emissions of methane are avoided (a strong greenhouse gas occurring when crops decompose). This offsets significant amounts of CO2eq. In addition, the water, inputs, but also labor and time that go into growing produce don't go to waste.

Today, SokoFresh has 9 cold storage units in operation. By 2023 (fifth year of operation), the team plans to have 190 units that are an expected to offset 7.7 million kg CO2eq emissions annually (from both solar power offsetting diesel as well as post-harvest loss reductions).

Background

Cold storage has a very low adoption rate in Kenya, especially for a country so dependent on agriculture. Cold storage at farm level is virtually non-existent in smallholder value chains. SokoFresh implemented CaaS to unlock cold storage at scale, while at the same time guaranteeing access to markets through a market linkage solution (a digital platform that facilitates direct trade between farmers and big buyers). SokoFresh approach ensures that smallholders have access to these innovations and are included in a more equitable way in the supply chain.

'Ecofrost Link is a completely modular concept developed and innovated by Ecozen Solutions. It is a solar-powered cold room that has the ability to pre-cool as well as stage commodities like Fruits, Vegetables, Flowers, and other perishables. It helps in shelf-life improvement and loss reduction of perishables by maintaining the right temperature, humidity, and airflow levels. Ecofrost Solutions Pvt Lt is the pioneer in this sector and patented10 technologies that go into making the product'.

– Ecozen Solutions

CaaS and SokoFresh

SokoFresh is a Supporting Partner of the CaaS initiative of BASE. SokoFresh has been exploring the feasibility and implementation of the CaaS model together with BASE, helping to disseminate success stories and strengthen the CaaS network. SokoFresh and BASE have explored synergies for the implementation of the CaaS model, as SokoFresh is currently offering the CaaS model in Kenya.

In 2020, SokoFresh has been a finalist for the CaaS Prize.

Technology Partner

The key technology partner of SokoFresh is Ecozen Solutions. Their Ecofrost Solar Portable Cold Room uses thermal energy storage, avoiding costly and environmentally unfriendly chemical battery technologies. With the renewable Solar PV as the primary source of energy, it eliminates or curtails the dependency on fossil fuel based energy sources and increases the penetration of technology into off grid geographical regions to reduce the GHG emissions from food wastages. Ecozen units are immediately compatible with non-flammable R448A which has a GWP of 1273 as per 5th rev, IPCC. However, the company is looking to bring about low GWP refrigerant solutions as soon as possible.

Simon Kiguru, operations lead, SokoFresh

About SokoFresh

SokoFresh is a social venture created to achieve social and environmental impact through a financially sustainable business model. SokoFresh's vision is to enable economic prosperity and fair value chains in rural communities. They do so by providing smallholder farmers with access to smart-climate innovations that empower their livelihoods.

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Fresh green beans in SokoFresh cold storage