



Silo Africa is using the Internet of Things (IoT) technology to monitor the quality and shelf life of grains by tracking moisture content, CO2 levels, and other vital parameters. Photo Credit: Silo Africa

Silo Africa's digitised grain stores cut post-harvest losses

By Murimi Gitari

In Africa, a significant portion of food loss happens early in the food value chain largely due to challenges in harvesting and handling, as well as insufficient storage and cooling infrastructure.

According to the Food and Agriculture Organisation estimates, post-harvest losses can be as high as 20 percent for cereals, 30 percent for dairy and fish, and 40 percent for fruits and vegetables.

Post-harvest losses in Kenya's agriculture sector are estimated at between 20 per cent and 30 per cent, with the horticulture sub-sector recording losses of up to 60 per cent, according to the Common Market for Eastern and Southern Africa (COMESA).

Agri-tech startups are making significant strides in reducing post-harvest losses through innovative approaches that involve providing smallholder farmers with access to digitised solutions.

Silo Africa, a Kenyan agritech startup founded by Eliud Rugut, is using the Internet of Things (IoT) technology to monitor the quality and shelf life of grains by tracking moisture content, CO2 levels, and other vital parameters. This allows farmers to manage their crops more effectively and reduce losses due to spoilage.

By leveraging this technology, Silo Africa helps farmers safeguard their crops from the detrimental effects of climate change and improve their overall profitability. Their

efforts have been recognised on various platforms, including securing second place at the prestigious AYuTe Africa Challenge in 2024 by Heifer International.

"Silo Africa is dedicated to empowering smallholder farmers by addressing one of the most critical challenges in agriculture—post-harvest losses. Recognising that these losses significantly impact food security, farmer livelihoods, and economic sustainability, Silo Africa leverages innovative digitised solutions to revolutionise traditional farming practices," says Eliud Rugut, the founder of Silo Africa.

By integrating technology, the company helps farmers improve the storage, preservation, and management of their produce, ensuring that a higher proportion of harvested crops reach

markets in optimal condition. The organisation also focuses on building farmer capacity through training and access to tools that enhance productivity and reduce waste.

Rugut says Silo Africa's mission goes beyond just reducing losses to fostering sustainable farming practices, increasing farmers' income, and contributing to food security and economic resilience within agricultural communities.

"We have developed digitised grain silos equipped with solar-powered sensors and monitoring technology that help farmers maintain optimal storage conditions for their grains like maize, beans, rice, coffee and pulses. These systems reduce spoilage by monitoring temperature, humidity, and other critical parameters in real time. The farmers then receive alerts

through short message service (SMS) or mobile app notifications in the event of any infestation from insects like weevils, large grain borers or rodents or changes in grain quality like moisture. This prevents grain losses and aflatoxin poisoning, which has greatly impacted on the health of farmers and animals," he says.

Offtakers like the millers, oil seed companies, and aggregators, and development organisations like the World Food Programme can subscribe to their platform and get access to premium quality grains. They can get into future contracts with their smallholder farmers as well through the same platform.

"Farmers are mostly worried about commodity prices falling, while buyers of coffee, beans, maize or wheat are worried about prices rising. Both parties have

the opportunity of locking into a future price, guaranteeing a stable income for the farmers and premium quality grains for the buyers," says Rugut.

In Africa, smallholder farmers depend on sun drying which is susceptible to weather conditions like rain, humidity, or lack of sunlight. This can delay or prevent proper drying, causing the grain to deteriorate before it is properly dried. The company provides farmers with mobile grain dryers on their farms, ensuring the grains are dried to the right moisture levels and preventing mold growth or cracking during storage.

"Our silos are hermetic [airtight] and are made from metal sheets, making them rodent-proof and insect-proof. We use smart sensors to monitor critical storage conditions such as temperature, moisture, and air circulation. Farmers receive real-time alerts through a mobile app, enabling them to take corrective action and preserve their crops' quality.



The Silos help farmers improve the storage, preservation, and management of their produce, ensuring that a higher proportion of harvested crops reach markets in optimal condition. Photo Credit: Silo Africa

For example, if moisture levels rise, the system advises the farmer to dry their grains thereby preventing spoilage,” says Rugut.

Technology adoption can be challenging without proper training. Silo Africa complements its technological solutions with on-the-ground training programmes. Farmers learn how to integrate these technologies into their daily operations, ensuring long-term success and sustainability.

Improper moisture levels can lead to grain spoilage, mold, and loss of quality, while over-drying reduces the weight and value of the grain. Pests, such as insects and rodents, can infest stored grain, leading to contamination and significant losses.

Digitised grain silos come equipped with moisture sensors that continuously monitor the moisture content of the grain. This allows for real-time adjustments in drying to maintain optimal moisture levels, ensuring grain is stored at the right moisture content for preservation and quality.

Rugut says that many smallholder farmers may face difficulties in affording the silos, as they require a large upfront investment. With their Pay-As-You-Store model, farmers are able to use the technology and pay in instalments according to their harvesting calendar.

Smallholder farmers often sell their grains at low prices during harvest time due to the high supply, fearing that improper storage will lead to spoilage and waste. By utilising the silos, the farmers can store their grains safely for over five years, allowing them to delay selling and take advantage of higher prices during off-peak seasons.

Also, insecticides are commonly used in grain storage to control pests like insects and rodents, but these chemicals can pose significant health risks to humans, animals, and the environment. Improper handling or overuse of insecticides can lead to residues on the grain, which may contaminate food supplies. Silo Africa's digitised grain silos are hermetic or airtight hence farmers do not need to use insecticides during storage preserving the taste, quality and safety of the grains.

Farmers who have adopted Silo Africa's digitised solutions have seen a marked reduction in post-harvest losses by 40 percent, enabling them to sell more of their produce at market. This increased output directly translates to higher earnings, helping them reinvest in their farms and improve their standard of living. The early adopters of the silos are now aggregating maize, beans and pulses earning more income.

“Reaching more farmers across diverse regions while maintaining quality and consistency in our services is a challenge. To address this, we are investing in local talent, empowering Community Change Agents who majority are women and youth, and leveraging digital platforms to expand our footprint sustainably,” Rugut says.

The company has successfully deployed its digitised grain storage systems in multiple regions, reaching thousands of smallholder farmers. The silos have allowed farmers to store grains for extended periods, preventing spoilage and enhancing food security.

Their innovative approach to grain storage has earned the company several prestigious awards for its sustainability and positive impact on agricultural practices. From securing 1st runner-up at the AYUte Africa Nextgen Challenge to being named the top climate-innovation startup of the year by the Kenya Climate Innovation Centre (KCIC). These accolades highlight their commitment to transforming the agricultural sector and driving long-term growth for smallholder farmers.



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