

Case study

# Catalysing climate-resilient agriculture in Kenya with solar-powered cold storage



A blended finance solution advancing food security, farmer livelihoods, and emission reductions through decentralized solar cold chain infrastructure



## Background

Agriculture remains the lifeblood of Kenya's economy, providing employment for over 70 percent of the rural population. Despite this central role, farmers, particularly smallholders, face persistent challenges that threaten both their livelihoods and national food security. Chief among these challenges are post-harvest losses, which exceed 40 percent annually for perishable crops. These losses are not only economically devastating but also contribute to greenhouse gas emissions due to food spoilage and the continued use of diesel-powered storage systems.

The causes of these losses are structural and multifaceted. Most farms lack nearby cold storage options, and those available often rely on polluting diesel generators. In many rural areas, market access is limited, especially for institutional buyers such as those involved in Home-Grown School Feeding (HGSF) programmes. Without proper aggregation, refrigeration, or reliable logistics, smallholders are unable to reach these higher-value markets. The private sector has shown limited appetite for investing in rural cold chains, citing high upfront costs and uncertain returns, while small-scale producers struggle to access credit or financing models adapted to their needs.





## Development finance solution

To address these challenges, the United Nations Capital Development Fund (UNCDF) and the United Nations Development Programme (UNDP) are jointly developing a comprehensive initiative to expand solar-powered cold storage infrastructure across Kenya.

**Building on early momentum from over nine counties, 12 eligible service providers, 12 local financial institutions, and multiple farmer cooperatives, the initiative is designed to scale a commercially viable and climate-resilient cold chain that supports food system transformation and emission reductions.**

An estimated 1,000 solar-powered cold storage units with a combined capacity of 5,000 tons will be deployed, forming a decentralized, often mobile, off-grid solar-powered cold storage (SPCS) units, strategically placed near farming clusters and aggregation points. These units will drastically reduce spoilage by preserving perishable crops closer to where they are harvested, while also strengthening linkages to institutional buyers and school feeding programmes. The joint initiative will integrate financial instruments, technical assistance, and digital solutions to unlock private investment, enhance farmer incomes, and ensure that the cold chain ecosystem becomes sustainable and scalable.

In 2024, the Mitigation Action Facility (formerly the NAMA Facility) approved €23.3 million in grant funding to scale this solution. Of this, €16.6 million will be implemented by UNCDF through blended finance mechanisms, while €6.7 million will be managed by UNDP for technical assistance, policy work, and training.

UNCDF will lead the financial implementation of the programme, deploying catalytic blended finance to derisk the cold storage market and unlock private investment. UNCDF will offer a

suite of instruments tailored to various cold chain actors, including concessional loans for large cold storage operators and technology providers, as well as via local financial institutions to smaller enterprises. In addition to loan guarantees designed to lower lender risk and improve credit flow into underserved segments. And a Tariff Support Facility (TSF), a performance-based investment grant, will provide early revenue stability to service providers, bridging viability gaps in the critical first years of operation. Through these instruments, the programme is expected to mobilize approximately €27 million in private investment, catalysing the growth of Kenya's solar cold chain market.

In parallel, UNDP will lead the technical component, strengthening the enabling environment needed for scale. This includes capacity building for farmers, cooperatives, and service providers on the use and maintenance of solar cold storage units; behavioral change campaigns to encourage adoption and trust; and policy engagement with national and county governments to establish supportive regulations and standards. A robust Monitoring, Reporting, and Verification (MRV) system will track performance and climate impact.

Together, this integrated approach will address both supply and demand barriers, reduce emissions, increase incomes, and contribute to Kenya's broader development and climate goals.





## Outcome

Over the ten-year programme horizon (2024–2034), the initiative aims to significantly reduce post-harvest losses, avoid 4.8 million tonnes of CO<sub>2</sub> equivalent emissions (direct) and reduce an additional 3.9 million tonnes (indirect), support over 60,000 smallholder farmers with better incomes and market access, and create 1,200 jobs across the cold chain value chain—from logistics and operations to technology deployment. It will also contribute to stronger, more reliable school feeding systems by improving food quality and supply chain consistency.

By anchoring solar cold storage within Kenya's agricultural and climate strategies, and combining UNCDF's financial innovation with UNDP's technical reach, this initiative demonstrates how blended finance and public-private collaboration can unlock new frontiers in climate-resilient agriculture.

By integrating finance, sustainable infrastructure, and digital tools, the initiative will catalyse SPCS adoption, improve farmer incomes, and increase the supply of high-quality produce to diverse buyers. It will aim to remove barriers to private sector engagement by reducing risk, improving project bankability, and expanding credit access, ultimately helping to build a sustainable, commercially viable cold storage market.



[Watch the full story](#)

**By integrating finance, sustainable infrastructure, and digital tools, the initiative improves farmer incomes, and increase the supply of high-quality produce.**

## At a glance

### Catalysing climate-resilient agriculture in Kenya with solar-powered cold storage

Total funding approved

**€23.3 million** from the Mitigation Action Facility

Technical component

**€6.7 million** (UNDP)

Financial component

**€16.6 million** (UNCDF)

Investment instruments

Concessional loans, loan guarantees, Tariff Support Facility

Digital tools

Mobile payments for storage use and data analytics

Estimated beneficiaries

**60,000+** smallholder farmers  
**1,200** jobs created

Private investment mobilized

**€27 million** (estimated)

Cold storage units

**1,000 units** with a combined capacity of **5,000 tons** (estimated)

Timeline

**2024 - 2034**

Emission reductions

**4.8M tonnes** direct  
**3.9M tonnes** indirect

Target Markets

Farming clusters, cooperatives, HGSF-linked supply chains

Partners

UNCDF (financial), UNDP (technical), Mitigation Action Facility

## About

### UN Capital Development Fund

United Nations Capital Development Fund (UNCDF) mobilizes and catalyses an increase in capital flows for impactful investments in high-risk markets, especially in Least Developed Countries, Small Island Developing States and countries in special situations. By crowding in capital through the deployment of risk-absorbing financial instruments, mechanisms and structuring advisory, UNCDF contributes to job creation, sustained economic growth and equitable prosperity in more than 70 countries.

In partnership with UN entities and development partners, UNCDF operates with speed and agility to deliver scalable, blended finance solutions to drive systemic change and pave the way for commercial finance and scale up by development finance institutions and multilateral development banks.

 [UNCDF stories across the globe](#)

## Contact

### More information:

Mounir Ezzeddine  
([mounir.ezzeddine@uncdf.org](mailto:mounir.ezzeddine@uncdf.org))

### Media enquiries:

Erika Antoine-Souklaye  
([erika.antoine@uncdf.org](mailto:erika.antoine@uncdf.org))

Follow us



 [uncdf.org](https://www.uncdf.org)

