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Improved livelihoods & nutrition for farming communities through solar energy

Insights from "Sustainable Energy for Smallholder Farmers in Ethiopia, Kenya and Uganda (SEFFA)" (2021-2024)

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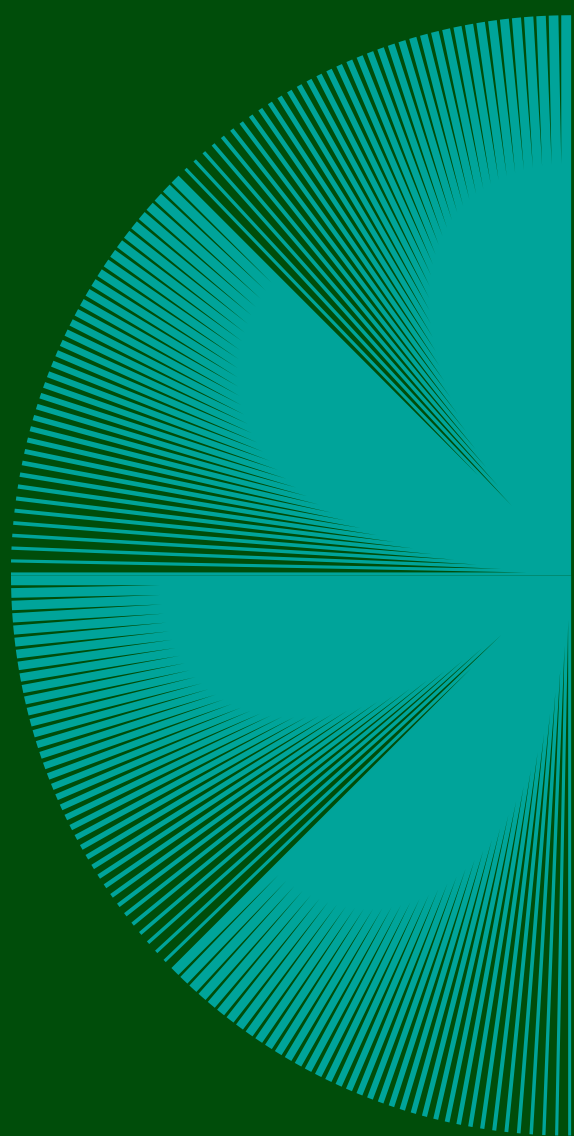
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About the project

Sustainable Energy for Smallholder Farmers (SEFFA)

SEFFA, which ran from 2021 to 2024 in Ethiopia, Kenya, and Uganda, increased access and adoption of renewable and energy-efficient technologies for smallholder farmers and agri-businesses.

By combining technology, finance, training, and market access, SEFFA supported farmers to boost productivity, reduce post-harvest losses, increase incomes, and contribute to climate protection.



Countries:

Ethiopia, Kenya, Uganda

Sectors:

Dairy and horticulture value chains

Project Duration:

2021–2024

Co-financing:

€8 million grant from the IKEA Foundation





Why Energy Matters

Smallholder farmers produce most of Africa's food – but lack access to reliable energy.

Farming in East Africa is tough: unpredictable rain, costly irrigation, and time-consuming manual work limit productivity. Modern tools could ease the burden – but they need reliable, affordable energy. Without it, solutions like water pumps remain out of reach.

SEFFA supported business models, that allow smallholder farmers to benefit from modern irrigation, drying, and cooling services at an affordable cost. These solutions not only increase food production and improve livelihoods in rural areas, but also strengthen climate resilience by helping farmers adapt to changing weather patterns and reduce post-harvest losses.

Key challenges faced by smallholder farmers:

- Crop losses due to unfavourable weather conditions
- High post-harvest losses due to lack of cooling or drying
- Time-consuming manual tasks (e.g. milking)
- High costs of irrigation powered by fossil fuels
- Limited market access and storage
- Gender inequality and limited business opportunities



Solar Solutions for Productive Farming

Technologies tested under SEFFA



Solar water pumps (SWPs) use energy from the sun to lift water from wells, rivers or boreholes, reducing reliance on costly and polluting diesel pumps.



Solar dryers, compared to traditional open sun drying, offer a more hygienic, faster and weather-resistant method for processing crops.



Solar cooling allows for preservation farm produce at farm gate, in transit or at markets to reduce food loss and access higher-value markets.

These productive use of energy (PUE) technologies help farmers lower costs, boost productivity, and improve product quality — while reducing environmental impact. To make them accessible, SEFFA supported innovative

financing models such as pay-as-you-go and partnerships with SACCOs and banks, enabling farmers to adopt solutions gradually without high upfront costs.

This demand-driven, inclusive approach ensures that energy access is both practical and affordable.

"With energy, I can irrigate crops on my farm, even when rains fail – it's the difference between farming to survive and farming to grow."

– Smallholder farmer, Kenya





Hello Solar (Ethiopia)

Hello Solar, an Ethiopian company providing solar-powered irrigation solutions, received a SEFFA Innovation Fund grant to overcome foreign currency constraints and import solar water pump (SWP) equipment. Their model combines farmer targeting, 30 – 50 % down payments, PAYGO repayment (USD 36 – 49/month), training, and ongoing support via a field office.



Results

500 – 1,000 m²
irrigated per farmer

9 of 12

targeted farmers
installed SWPs

30 %

productivity increase in
avocado, vegetable, and
forage production

PAYGO model
proved feasible
and improved
affordability

Lesson

Combining accessible finance, localised support, and training can accelerate adoption of productive-use solar technologies – regulatory clarity and forex access are key for scale-up.



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Plumbee (Kenya)

In a region dominated by small-scale maize farming, Plumbee Wholefoods, a women-led Kenyan startup producing fortified children's food, partnered with 88 women farmers to introduce pumpkin as a high-value alternative crop. The women completed a 5-week training on good agricultural practices, climate-smart methods, and solar drying techniques. A centralized 500 kg-capacity solar dryer was installed, agreed upon by producer groups and Plumbee. With supply contracts in place, the women now earn income from value-added pumpkin products – boosting livelihoods and promoting sustainable farming.



Results

€2,100

of in additional income
for farmers

Over
3,000 kg

of pumpkin processed

30 %

of shorter drying time
compared to open sun
drying

Lesson

Effective user training is essential when introducing new technologies to ensure their full benefits are realized. Pilots should allow room for iteration and technology improvement based on user feedback.





Akajumbura Dairy Farmers' Cooperative Society (Uganda)

Founded in 2008, Akajumbura Dairy Farmers' Cooperative Society was spending ~USD 1,600/month on diesel to cool 5,300 litres of milk. In 2021, SEFFA installed a pilot solar-powered cooling system, then facilitated a financing partnership with Rwanyamahembe SACCO. This led to a USD 18,000 loan – interest and fees covered by SEFFA – funding 51 solar panels and 64 batteries to meet full operational needs.



Results

~70%

monthly savings on operation costs

80%

Reduction in generator maintenance

2x

Increase in cooling hours

Lesson

Targeted energy investments, combined with smart financing, can dramatically reduce operating costs and improve reliability – while building the financial credibility of farmer cooperatives.



What SEFFA achieved

► Outcome 1

Increased access to PUE technologies for smallholder farmers through viable business cases



3 Solar drying



4 Solar cooling



6 Solar powered Irrigation

► Outcome 2

Capacitated local actors in the operation of PUE technologies

5,375
Smallholder
farmers



33 %

Share of women are capacitated in sustainable operation of PUE technologies

► Outcome 3

Businesses mainstreaming PUE technology & provide sustainable energy services to smallholder farmers and their livelihoods



15 Businesses supplying solar PUE technologies



6 Financial Institutions providing affordable credit lines

Dive Deeper

This brochure highlights selected learnings from the SEFFA pilot portfolio. For full case studies, data sets, and implementation insights, visit:





Sustainable Agriculture: A Promising Model for the Future

SEFFA demonstrates how energy innovation, local entrepreneurship, and knowledge-sharing can drive a more sustainable, resilient, and nutrition-secure future for smallholder farming.

By replacing fossil fuels with solar energy, the approach not only reduces emissions but also strengthens livelihoods, food systems, and communities' ability to adapt to climate change.

"The SEFFA project brings deep local knowledge and a strong track record in energy access. At the IKEA Foundation, we're proud to support their work with smallholder farmers in East Africa. By backing early-stage innovations, we help test new business models that can shift entire systems. It's about using our philanthropic capital to unlock practical solutions that improve lives and protect the planet."

– Jolanda van Ginkel, Head of Portfolio - Renewable Energy (IKEA Foundation)

"Solar energy has the potential to sustainably transform agriculture in East Africa – for higher yields, increased income, and a climate-friendly future."

– Samwel Naimasia, Project Coordinator (GIZ)

"SEFFA shows how strong collaboration and innovative business models can unlock the power of energy access to transform livelihoods and food systems."

– John Ngigi, Energy Sector Lead (SNV)

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Emmanuel Kifotuko, CEO Emrich Farms in Uganda ©GIZ

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