



Powering Renewable
Energy Opportunities

Cultivating Opportunities in Africa:

Powering Agricultural
Productivity Through
Renewable Energy
Integration



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Foreword

As Africa stands on the cusp of unprecedented growth, one of its greatest challenges (and opportunities) is securing the future of its food systems. With the continent's population projected to more than double by 2050, ensuring reliable food production and distribution is critical not only for health and well-being, but to create lasting prosperity. Africa holds immense agricultural potential, boasting 65% of the world's remaining uncultivated arable land, abundant water resources, and a vibrant workforce. However, unlocking this potential requires overcoming significant hurdles: dependence on rain-fed agriculture, high post-harvest losses, and the growing impacts of climate change.

This report provides an overview of what is possible by focusing on the integration of Productive Use of Renewable Energy (PURE) technologies in agriculture across sub-Saharan Africa to boost locally led, demand-driven activities. Solar-powered mechanisation, water pumps, refrigeration, and cold storage offer a transformative path towards improving productivity and reducing losses. These technologies are not just a solution to Africa's agricultural challenges, they represent a foundation for building local resilience, increasing incomes, and improving the livelihoods of millions of smallholder farmers across the continent.

Since 2019, with support from the UK government and IKEA Foundation, Powering Renewable Energy Opportunities (PREO) has been dedicated to taking risks and providing catalytic grant funding to enable businesses to harness renewable energy to improve farmers' incomes, build climate resilience and reduce reliance on fossil fuels. This approach has paid off and through this report, the PREO team is pleased to be able to shine a spotlight on five pioneering companies - Simusolar, Good Nature Agro, Heifer International, Koolboks, and SokoFresh - that are paving the way for use of PURE technologies to enhance African agriculture value chains. These companies are solving critical challenges, from financing solutions to market linkages, and have developed practical, scalable models that can be replicated across the region. Furthermore, many of the innovations help to keep the added value close to the field, with farmers themselves feeling the benefits.

The work being done by PREO and its partners is creating more than just a technological shift; it is contributing to a future where smallholder farmers can thrive, local economies grow, and communities gain food security and stability. With every successful project and partnership, the message is clear: Africa's agricultural potential is vast, and with the right innovations, it can fully benefit from the resources available.

As we look to the future the challenge is great, but so is the opportunity. We are grateful for the continued support of the programme's funders, alongside our delivery partners Energy 4 Impact, to enable PREO to harness this opportunity. By investing in the right solutions today, we can contribute to a prosperous, food-secure Africa for tomorrow. At the Carbon Trust, we are committed to supporting this journey.



Michael Rea,
CEO the Carbon Trust



Executive summary

According to the United Nations, food production must increase substantially by 2050 to meet the demand of the world's growing population¹. This is no more the case than on the continent of Africa, which is projected to see a 63% rise in population by mid-century. By 2050, this will result in a global population in which 1 in 4 people will be African². The natural landscape in Africa is well-positioned to address the burgeoning demand for food, both locally and globally. The continent encompasses around 65%³ of the world's remaining uncultivated arable land, has a significant working-age population, as well as significant freshwater resources in many countries. Taking up the opportunities to improve productivity and quality of produce has important local benefits, including more stable food supply, improved nutritional content, and increased incomes spanning the food supply chain. There is also the opportunity for African farmers to become a cornerstone of global food security.

The integration of Productive Use of Renewable Energy (PURE) technologies into agriculture in sub-Saharan Africa offers a transformative forward path. Solar-powered mechanisation, solar water pumps, refrigerators, freezers, dryers, and cold storage units are not just technologies of the present, but also a route to a sustainable agricultural revolution. By adopting such innovations, farmers can dramatically enhance agricultural productivity, preserve the quality of produce, and reduce losses, thus contributing to a resilient global food system.

Powering Renewable Energy Opportunities (PREO) has been at the forefront of this journey, enabling business model innovations that lower customer acquisition costs, improve affordability, and deploy modular solutions. This report showcases five forward-thinking companies within PREO's portfolio, that are setting new benchmarks for the adoption of PURE technologies in agriculture.

Featured companies, activities and outcomes:

- **Simusolar** (Uganda and Tanzania)
Established distribution networks through a micro-partnership model and optimised solar water pump

sizing methodology, leading to improved sales cycles and portfolio quality.

- **Good Nature Agro** (Zambia)
Expanded the market for solar water pumps through a Joint Liability Group financing model, including financing the cost of boreholes.
- **Heifer International** (Uganda)
Introduced a lease-purchase plan for dairy co-operatives, enabling access to solar-powered cooling solutions with zero upfront costs.
- **Koolboks** (Nigeria)
Developed solar-powered refrigerators and freezers, with flexible payment plans and extensive market activation campaigns.
- **SokoFresh** (Kenya)
Piloted solar-powered cold storage-as-a-service and a digital market linkage platform, ensuring a traceable supply chain and reducing post-harvest losses.

Although there has been much progress towards scaling PURE technologies in the agricultural setting in sub-Saharan Africa, significant hurdles remain. Key challenges include lack of awareness among farmers⁴, high upfront costs, limited access to financing⁵, inconsistent policies⁶, and societal barriers⁷. Business model innovations are crucial to overcoming these obstacles and accelerating the adoption of PURE technologies.

PREO-supported companies are demonstrating the potential of business model innovations to make PURE technologies more accessible and attractive to smallholder farmers. By showcasing successful strategies and fostering discussions on replicable models, this report aims to inspire broader adoption of sustainable agricultural practices. With the demonstration of successful business models, the investment potential of PURE-supported companies is clear. The collective impact of these efforts can significantly improve food security, boost economic development, and mitigate climate change effects on agriculture.

¹ <https://www.fao.org/4/ap106e/ap106e.pdf>

² <https://www.uneca.org/stories/%28blog%29-as-africa%E2%80%99s-population-crosses-1.5-billion%2C-the-demographic-window-is-opening-getting#:~:text=Africa%20has%20been%20at%20the,touch%202.5%20billion%20by%202050.>

³ https://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/Feed_Africa-Strategy-En.pdf

⁴ <https://www.fao.org/support-to-investment/news/detail/en/c/1652579/>

⁵ https://www.globallandscapesforum.org/wp-content/uploads/2022/09/Aceli-Africa_Full-Report.pdf

⁶ https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2024/Jul/IRENA_SS_Africa_policies_finance_RE_2024.pdf

⁷ <https://www.fao.org/in-action/women-in-agrifood-value-chains/en/>

Introduction

According to the United Nations, food production must increase substantially by 2050 to meet the demand of the world's growing population⁸. The burgeoning demand will likely see the world turn increasingly to the continent of Africa, which encompasses around 65%⁹ of the world's remaining uncultivated arable land. With significant freshwater resources and a high percentage of the population being of working-age, many African countries are positioned to play a pivotal role in future global food security. Importantly, improved productivity and produce quality also has significant local benefits, including more stable food supply, improved nutritional content, and increased incomes.

However, several barriers restrict this potential. Currently, Africa relies heavily on rain-fed agriculture, which is vulnerable to climate change and seasonal variations. Moreover, post-harvest losses can be very high, with up to 38%¹⁰ (FAO and IIR estimates) of fruits and vegetables perishing before they reach consumers due to inadequate storage, transportation, and processing facilities.

Productive use of renewable energy (PURE) appliances can play a major role in improving yields, preserving the quality of produce, and reducing losses. By enhancing these aspects, PURE technologies contribute significantly to improving food security on a global scale. Recognising the immense potential of these innovations, so far PREO has supported 14 companies developing PURE technologies in agriculture, including solar-powered mechanisation, solar water pumps (SWPs), solar-powered refrigerators and freezers, solar dryers and large off-grid cold storage units. PREO's support includes providing catalytic grant capital, technical assistance, and market creation through knowledge products.

PREO is guided by the belief that solving food security challenges through PURE technologies represents a business model innovation challenge rather than solely a technology hurdle. The necessary technologies are becoming increasingly mature. This maturity is supported

by the ongoing drop in technology prices and volatile fossil fuel costs, which act as timely catalysts for the transition. To drive accelerated adoption, business model innovations are crucial for reducing customer acquisition costs, improving affordability for users, and deploying modular solutions.

In this report, we highlight five companies within the PREO portfolio which are operating in sub-Saharan Africa (SSA), two with a focus on irrigation and three with a focus on cooling. These companies exemplify how business model innovations are accelerating the adoption of PURE technologies in agriculture, by overcoming market barriers. This has included innovative approaches to financing, development of strategic partnerships, and use of digital technology to support market linkage.

PREO believes these examples can help inform further discussions and opportunities to replicate. By showcasing the successes and strategies of these innovative companies, PREO aims to inspire others in the sector to adopt similar approaches, thereby accelerating the transition to sustainable and resilient agricultural systems. This collective effort has the potential to significantly improve food security, boost economic development, and mitigate the impacts of climate change on agriculture.

PURE technologies for agriculture are maturing, available and effective in sub-Saharan African countries

One of the earliest and most impactful PURE technologies for agriculture in countries in sub-Saharan Africa (SSA) has been the pre-harvest intervention of solar water pumping (SWP) systems. Although exact figures can vary by country and specific pump models, several trends have contributed to a substantial price reduction over the last decade. Key factors include the declining cost of solar photovoltaic (PV) technology, which saw an 82% price reduction between 2010 and 2020¹¹ and at least a 60% reduction in the prices of lithium-ion batteries between 2010 and 2018¹². Supportive government policies (including reduced taxation) have also been impactful, as have economies of scale. SWP units are now commonly available across SSA countries, distributed

⁸ <https://www.fao.org/4/ap106e/ap106e.pdf>

⁹ https://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/Feed_Africa-Strategy-En.pdf

¹⁰ <https://iifir.org/en/news/reducing-post-harvest-food-losses-in-sub-saharan-africa>

¹¹ <https://www.irena.org/Energy-Transition/Technology/Solar-energy>

¹² <https://ourworldindata.org/battery-price-decline>



by a range of companies, from small local distributors to large manufacturers with extensive distribution networks. Reflecting this growth, GOGLA reports¹³ that 47,856 SWP units were sold by its affiliated members between 2022 and 2023, with the majority of sales occurring in SSA countries.

In the post-harvest sector, strong sales traction is seen for PURE technologies including solar-powered cold rooms, refrigerators, and freezers. Companies like InspiraFarms, along with technology providers from Asia such as Ecozen and InfoCold, and European firms like SelfChill, have shown keen interest in the market in SSA countries. These companies are actively partnering with regional distributors to make these units accessible. Innovations such as thermal energy-based batteries (avoiding the need for chemical batteries) and IoT-enabled predictive maintenance, as well as sub-zero cold storage technology, are enhancing the use cases and efficiency of these systems.

The market is also seeing progress from local companies across multiple SSA countries that are building their own cold storage units, either importing components or developing their own cooling technologies. The fastest growth within the cooling segment, however, is seen in solar-powered refrigerators and freezers. Manufacturers including Amped, Koolboks, and SureChill are expanding their reach rapidly by entering new markets through partnerships with entities that already have established distribution networks, such as large solar home system (SHS) distributors. The quick penetration of these technologies was evidenced by the 2023 PREO Africa Call for Proposals, which received approximately 30 applications from distributors of solar-powered freezers and refrigerators, from 14 countries.

Beyond the technologies discussed above, other PURE interventions gaining traction in agriculture include solar-powered egg incubators, compact millers, ultra-low volume (ULV) sprayers, DC-powered agro-processing equipment, solar dryers, solar-powered farm mechanisation equipment, and solar-powered precoolers. These technologies are at various levels of availability, maturity, and adoption, but the overall direction is strong and encouraging.

PURE technologies in agriculture face significant hurdles to achieving scale in sub-Saharan Africa

Despite the availability and maturity of PURE technologies, their adoption in agriculture in SSA countries faces significant challenges.

Lack of awareness

One of the most significant barriers to the adoption of PURE technologies in SSA countries is the lack of awareness among farmers and agricultural stakeholders. According to the Food and Agriculture Organization (FAO)¹⁴, smallholder farmers can be hesitant to adopt technology due to a lack of technical skills and knowledge. As a result, the cost of creating a demonstration effect is high and the turnaround time to secure customers is longer. For instance, the sales cycle for solar water pumping units can be 2 to 3 months or more; in contrast, the cycle can be as short as a day for purchasing solar lighting products for the household.

High upfront costs

The initial investment required for PURE technologies can be prohibitively high for many smallholder farmers in SSA countries. For example, the cost of installing a solar water pump can range from USD 500 to USD 5,000, depending on the system's capacity and local market conditions. The landed cost of a 5-tonne cold storage unit can vary from USD 30,000 to USD 45,000 and the units that come with sub-zero technology are even more expensive. Solar-powered refrigerators and freezers from various distributors have a starting cash price of USD 900, and can go up to as much as USD 2,000 or more depending on the capacity.

Limited access to financing

Access to financing is a critical issue that significantly impacts the adoption of PURE technologies in SSA countries. Traditional financial institutions often consider lending to smallholder farmers as high-risk due to fluctuating income, lack of collateral, and the perceived unpredictability of agricultural investments. For instance, 60-70% of the population in East Africa works in agriculture but it receives less than 10%¹⁵ of commercial bank lending in most countries, in some cases as little as 2%.

¹³ <https://www.gogla.org/reports/global-off-grid-solar-market-report/>

¹⁴ <https://www.fao.org/support-to-investment/news/detail/en/c/1652579/>

¹⁵ https://www.globallandscapesforum.org/wp-content/uploads/2022/09/Aceli-Africa_Full-Report.pdf



Inconsistent policies and regulatory frameworks

Inconsistent and often unclear policies and regulatory frameworks present another major challenge to the adoption of PURE technologies in SSA countries. According to IRENA¹⁶, renewable energy investments in the region are unevenly distributed, with most investments going to economies with relatively advanced policy, regulatory and investment frameworks. IRENA cited Bloomberg NEF (2023)¹⁷ as showing that the top three recipients – South Africa, Nigeria and Kenya – received more than two-thirds of all renewable energy investments going to sub-Saharan Africa in 2021-2022.

Cultural and behavioural barriers

Cultural and behavioural factors also play a role in the slow adoption of PURE technologies. Traditional farming practices and resistance to change can prevent farmers from embracing new technologies. Additionally, social dynamics, such as gender roles and decision-making hierarchies, can influence the willingness and ability of farmers to adopt new technologies. As noted by the Food and Agriculture Organization (FAO), women make up nearly 50%¹⁸ of the agricultural workforce in SSA countries but often have less access to resources and decision-making power, which can impact the adoption of new technologies.

PREO demonstrates that getting to the right business model can overcome barriers and accelerate adoption of PURE technologies

Identification of appropriate business models is crucial for adapting PURE technologies to the specific needs and constraints of the agricultural sector in SSA countries. By rethinking traditional approaches to product delivery, financing, and customer engagement, companies can make these technologies more accessible and attractive to smallholder farmers. PREO has enabled around 40% of its total portfolio of companies to pilot innovative approaches to overcome key agricultural sector challenges and enhance adoption and scalability. By fostering these innovations, PREO has catalysed progress in financing mechanisms, distribution networks, and technology integration across the region.

In this report, we spotlight five companies from PREO's portfolio that exemplify the transformative impact of

business model innovations in agriculture. PREO funds were used to support the following developments:

Simusolar (Uganda and Tanzania)

Simusolar established robust distribution networks across multiple countries, selling over 1,000 units of SWPs. Their approach emphasised optimised pump sizing and strategic partnerships, resulting in shortened sales cycles and potential improvements in portfolio quality.

Good Nature Agro (GNA) (Zambia)

GNA, a leading demand aggregator of legume seeds, expanded the market for solar water pumps through a Joint Liability Group (JLG) financing model. This innovative approach included the cost of boreholes in addition to pump systems. GNA is one of the first companies to take this approach in the context of a SSA country, facilitating broader adoption among farmers.

Heifer International (Uganda)

Heifer International introduced a Lease Purchase Plan for dairy co-operatives, enabling them to access solar-powered cooling solutions at milk chilling centres with zero upfront payment. This initiative aimed to increase productivity in the dairy value chain by overcoming financial barriers.

Koolboks (Nigeria)

Koolboks introduced solar-powered refrigerators and freezers to Nigerian fish traders through a lease-to-own model, enabling sustainable cooling solutions with flexible payment plans. This initiative reduced stock spoilage by 30%, lowered operational costs, empowered women entrepreneurs and attracted significant private investment.

SokoFresh (Kenya)

SokoFresh piloted solar-powered cold storage-as-a-service for smallholder farmers across Kenya to reduce post-harvest losses. It combined this with a digital market linkage platform which integrates small- to medium-sized farmers with professional value chains. Since its pilot programme in 2020, SokoFresh has onboarded over 14,500 farmers who have experienced an average increase in income of 20%.

¹⁶ https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2024/Jul/IRENA_SS_Africa_policies_finance_RE_2024.pdf

¹⁷ <http://www.bnef.com/interactive-datasets/2d5d59acd9000005>

¹⁸ <https://www.fao.org/in-action/women-in-agrifood-value-chains/en/>

Simusolar

Achieving high repayment rates and lowering customer acquisition cost

Simusolar

Simusolar began operations in 2014, selling solar-powered fishing lights to fishing communities in Tanzania. In 2017, Simusolar began procuring solar water pumps (SWPs) from manufacturers and distributing them to smallholder farmers. The company's primary business function includes design, procurement, installation, financing and after-sales service of SWPs, targeting farmers with a cultivable land area of between 0.5 and 30 hectares. In 2020, with support from PREO, Simusolar expanded its operations into Uganda through a majority-owned subsidiary 'Tulima Solar'. Simusolar has sold over 1,400 SWPs in Tanzania and around 1,000 SWPs in Uganda, 82% of the sales on a pay-as-you-go (PAYG) basis¹⁹.

If the pump breaks, repayments stop

Obtaining high repayment rates, among other outcomes, is linked to ensuring efficient and reliable pump performance. If the SWP does not work, the customers stop making repayments. Understanding the root cause of the issue, to assist the customer in maintaining repayments, is an expensive process, especially when it involves technician visits to rural areas. Even as remote monitoring and predictive maintenance capacities are being built to address such scenarios, Simusolar engages this issue with a different perspective, seeing it as a design problem, not an after-sales issue.

No pump meets more than 10% of market demand

When the target market was broken down across six categories based on various demand and supply side factors, Simusolar found that none of its pumps could meet more than 10%²⁰ of the market demand. The factors include the water source, farm topography, type of crop, the height through which the pump is designed to lift water (head), whether portability is necessary, and how much water is pumped in an average day (volume per day). In other words, Simusolar realised that it needs to custom design each system to ensure it works for the farmer. That results in a diversity of components with at least 10 pumps with different technical specifications to meet the varying applications of its target market. In comparison, distributors in other markets offer a standard set of 2 or 3 pumps to customers. A consequent outcome can be that pumps are



Image credit: Simusolar, Tanzania, 2024, PREO

under- or over-sized, with the farmers receiving no water or ending up with expensive systems.

Simusolar followed an EPC approach to delivering SWPs

The company has addressed this scalability challenge through an automated design process, targeting product optimisation for the customer. Simusolar physically visits the customer to assess demand parameters such as water requirements and the irrigation calendar, alongside storage supply parameters such as water depth, water source and distance to source. Using the data collected, the Simusolar app carries out the complex task of creating an instant design that is assessed remotely. Using this automated process, Simusolar is then able to take an 'EPC' approach²¹ to solar water pumping, delivering custom-built solar array sizes, pumps, pipes, wires and storage units for the farmers. Simusolar can provide bespoke solutions because it is selling varying models from various suppliers. Since the custom-designed pumps achieve satisfactory performance, the company can achieve high repayment rates.

¹⁹ Simusolar sells SWPs on up to 22-month payment plans. PAYG price varies from USD 350 to USD 7,000 or more depending on the technical specifications

²⁰ Observation was made through a series of tests conducted as part of Global LEAP Awards – 2019 Buyer's Guide for SWP

²¹ An 'Engineering, Procurement and Construction' approach that designs bespoke solutions based on customer needs.



High cost of customer acquisition is one of the biggest scale-up challenges

In the case of a solar home system company, almost every household in a village is a potential customer. Once the first customer is won, their well-lit household attracts immediate attention and alerts neighbours to the appeal of acquiring a solar home system. However, for SWP companies, the target customers in a village are fewer, being the ones with the right combination of water source, vegetation, acreage and available cash. News of a successful implementation of a SWP system may therefore travel much more slowly. This leads to sales cycles for SWP companies that are as long as 2 to 3 months, in contrast with the same-day sales experienced by some solar home system companies. Additionally, the farms are not concentrated in urban centres, but are geographically highly dispersed, making farmers harder and more expensive to reach.

Micro-partnership model reduced customer acquisition costs, accelerated lead conversion time and achieved high portfolio quality

Simusolar developed a 'micro-partnership' model to accelerate customer acquisition and lower acquisition costs. Through this model, Simusolar engaged with value

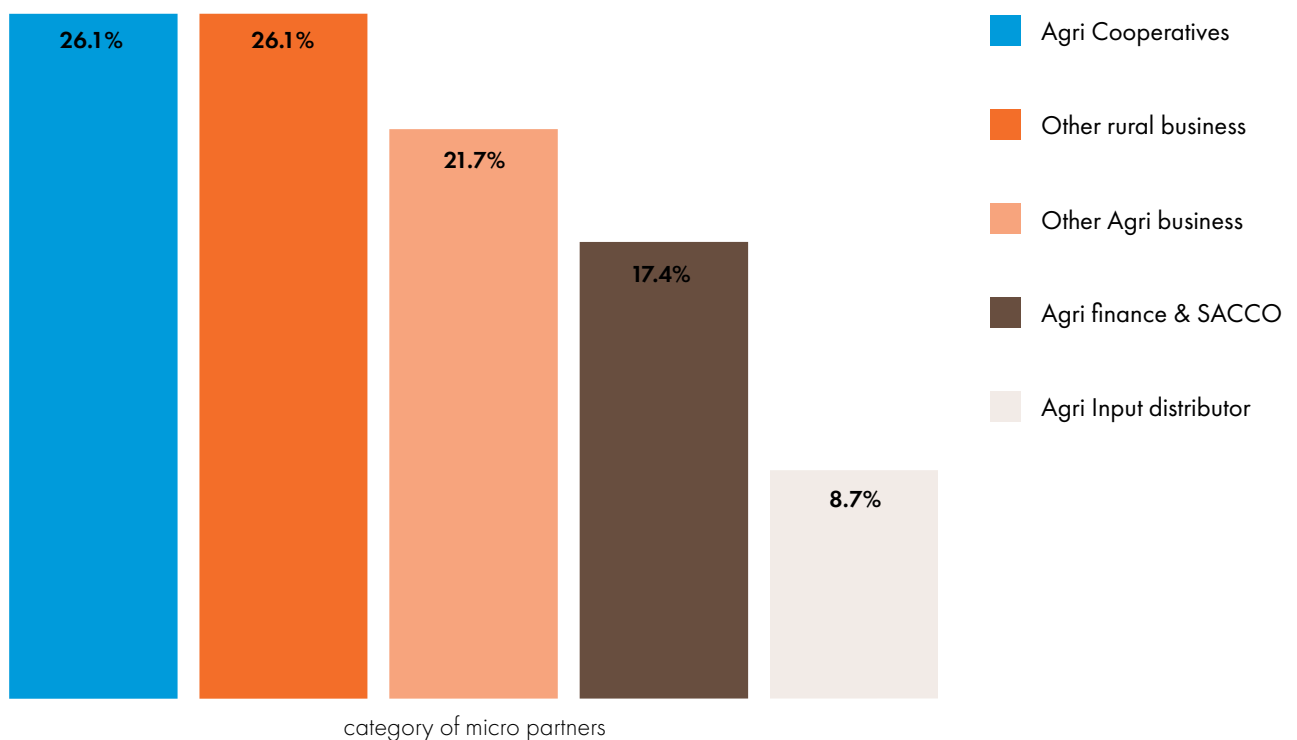
chain players that already have a validated linkage with the farmers. These can be agri input distributors, agri dealers, demand aggregators, and others, who are interested in the farmer doing well. For instance, an agri input company knows that, if a farmer irrigates, they can then sell more seeds to the farmer the next season. Simusolar equipped these partners with capacities around the design of SWPs (by providing them with general knowledge about the benefits of SWPs) and promotion of SWPs (by effectively enabling them to use demo farms).

Through the 'micro-partnership' model, Simusolar accelerated sales in Uganda and observed a range of benefits:

- Fewer false leads, since awareness was created among suitable customers (having adequate demand for SWP and capacity to repay) by the micro-partners;
- Simusolar rapidly gained credibility and trust, shortening sales lead-time;
- Improved repayment rates since farmers were already known to micro-partners.

Simusolar considers this micro-partnership model as a key factor that enabled them to sell 600 SWPs from

Simusolar acquired 23 micro-partners in Uganda



2020-2021, despite COVID lockdown measures. They now sell over double that amount on an annual basis, a 4x multiple of the growth rate.

Key learnings

- Getting the solution right for farmers is critical to ensure their success and consequent repayment rates; and custom designing solutions is the way to get the solution right.
- Financing is critical to adoption and financial services providers are not offering to farmers; for the time being, last-mile providers have to offer it if they want to serve the market.
- The choice of agri value chain in which the partner is identified is important. Simusolar, after partnering with a large coffee co-operative in Uganda, found that coffee farmers (averaging 1 hectare of coffee cultivation) were unable to realise revenue gains to pay off the SWP.
- Solar home system partner companies also did not help to generate traction. Simusolar learned that solar home system customers were generally not commercially viable farmers and had poor affordability for SWPs.
- Simusolar experienced positive traction with partners from the horticulture, livestock and dairy sectors.



A smiling woman with dark skin and hair, wearing a blue t-shirt with a star pattern and a colorful patterned wrap around her waist, carries a large, heavy, woven wooden basket on her head. The basket is overflowing with several ears of yellow corn. She is standing in a cornfield with tall stalks of corn around her. The background shows a clear blue sky with some light clouds. The overall scene is bright and sunny, suggesting a clear day in a rural agricultural setting.

Good Nature Agro

Expanding the serviceable market for solar water pumping

Good Nature Agro

Good Nature Agro (GNA) is a for-profit social enterprise that began operations in 2014 supporting farmers to produce high-value legume seeds. Seeds were initially produced at Good Nature Foundation Farm and then multiplied through smallholder seed farmers contracted to GNA, of which 40% are women. Contracted farmers receive input packages (including seed, and other inputs) at no immediate cost. At harvest, all their yields are purchased by GNA after the deduction of their seed pack loan. In 2019, GNA set up its 'Source' business, through which it sold seeds to growing agri commodities through a network of contract farmers. Source farmers pay 50% deposit for the input package, with the remaining being financed by GNA along with the provision of high-quality extension services.

Serviceable solar water pump market expands significantly with affordable finance and accessible water sources

According to a Lighting Global report²², for solar water pumps (SWPs) the total addressable market comprises 38 million farmers (without factoring in subsistence farmers). Due to lack of grid connection, lack of

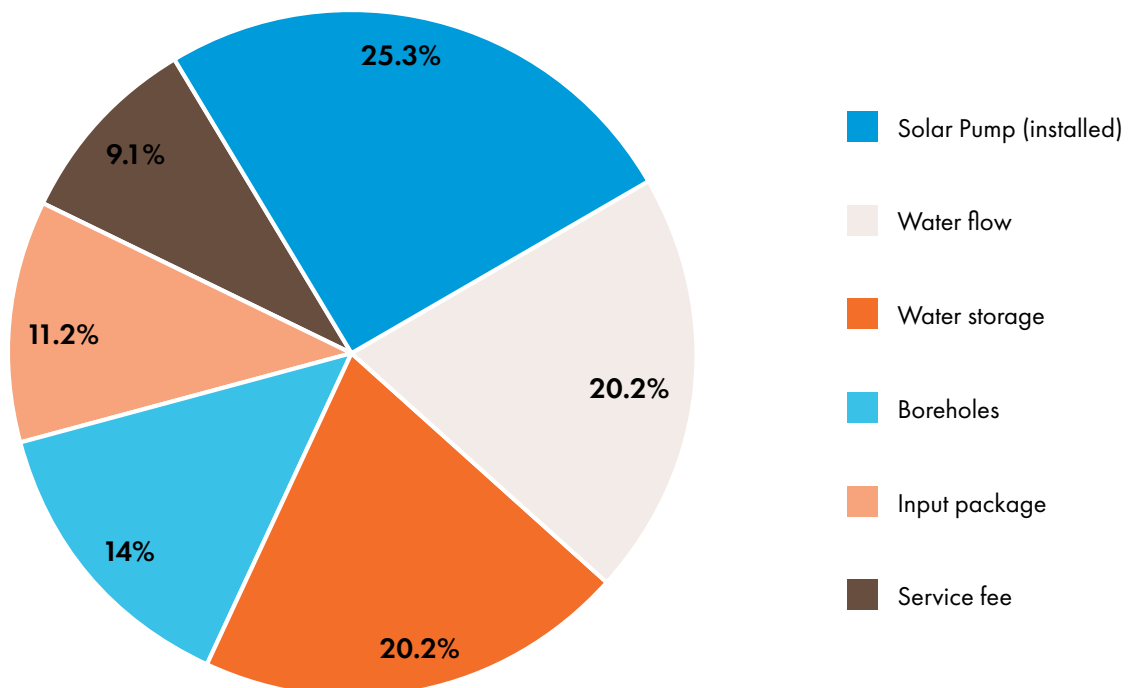
accessible water source, and/or lack of affordability, the total serviceable market is only ~700,000 farmers. At the same time, evidence suggests that Africa possesses 0.66 million cubic km of groundwater²³ 100 times the annual renewable freshwater resource on the surface. Borehole-driven solar water pumping provided through affordable financing can, therefore, expand the serviceable market, bring in new customer segments, and accelerate SWP adoption.

With support from PREO, Good Nature Agro demonstrated the viability of a financing product that included a borehole along with a solar water pump, tank and drip kits.

Financing package provided a 360-degree solution – from water access to market linkage

The irrigation financing product designed and piloted by GNA is complementary to existing ones offered by solar water pump (submersible type) distributors. Solar powered irrigation with a borehole water source is scalable and can be deployed by farmers on a wide range of farms - regardless of their proximity to standing water areas.

Borehole irrigation - loan package



Illustrative breakdown of a financing package of approx. USD 12.5k; Source – Good Nature Agro

²² <https://www.lightingglobal.org/wp-content/uploads/2019/09/PULSE-Report.pdf>

²³ https://nora.nerc.ac.uk/id/eprint/17892/1/ERL_A%20macdonald2012.pdf



The USPs of the financing package were:

- For the first time in the region, the financing package included setting up borehole infrastructure and solar irrigation equipment for farmers who did not have access to surface water.
- Agronomic support to farmers to help them grow high value produce that has high water demands was included in the package. The financing package also assured offtake through a market linkage service. Towards implementing them both, a service fee of approx. 10% was collected.
- Since drilling a borehole cost more than USD 1,500 and the financing package was comprehensive, covering all necessary inputs and market linkages, the price of the package was higher. As a result, the financing package was offered to groups of farmers, who could share costs.

GNA's Joint Liability Group model targeted groups of up to 5 farmers. All the farmers that formed a group belonged to the same community and had received approvals from the community chief to make use of 1ha of community land for drilling a borehole and growing vegetation. As mentioned, the financing package included coverage for a borehole, solar water pump, and other inputs; and required a down payment followed by a series of 2 or 3 repayments. The down payment amount was deducted from the contract farming payments from GNA to farmers during the May season, with repayments scheduled to

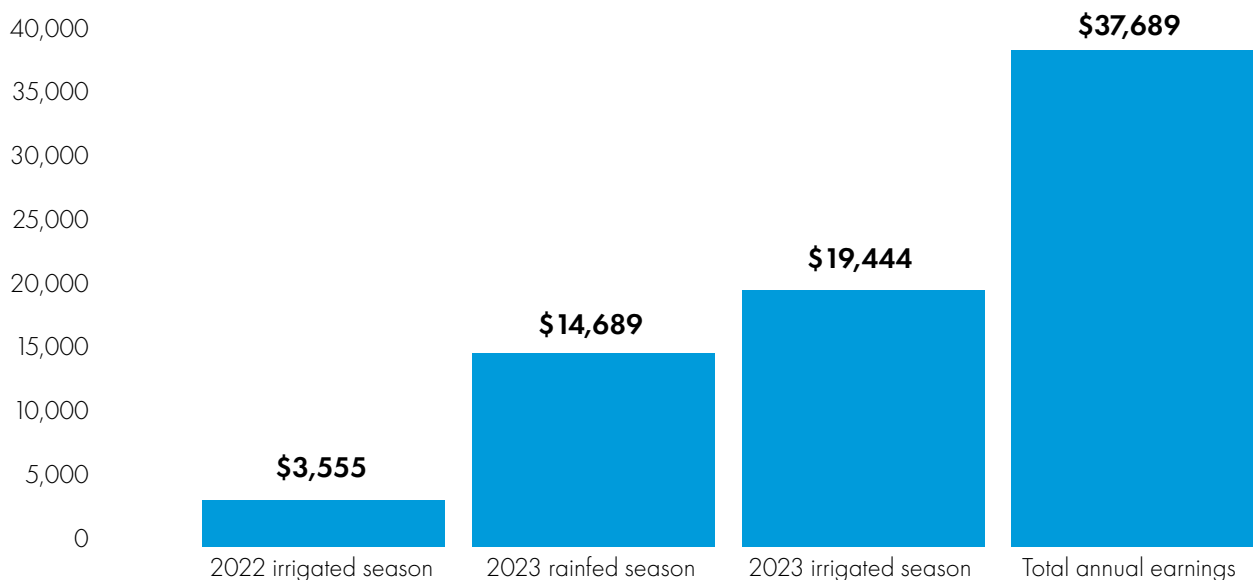
be deducted from the sale of produce from successive irrigated and rainfed seasons. This hire purchase or rent-to-own model will transfer the asset to the farmer groups when the loan is repaid. As part of the loan, GNA supported the farmer groups with extension services such as agronomic support, training and market linkage for selling the produce.

Key results

A total of 8 farmer groups were onboarded into the financing platform. Approx. USD 65,500 (ZMW 1.73 million) in loans were disbursed in financing. The first set of farmer groups was onboarded during May 2022 and achieved 3 harvests (Dec 2022, May 2023, Sep 2023) within 12 months. The second set received financing in mid-2023 and had their first irrigated harvest in Dec 2023. Based on the results observed from the first set of farmer groups, the following results were seen:

- **In their first irrigated season** (Dec '22), 15 tonnes of onions were produced. However, because of the late harvest due to delayed implementation of equipment, 7 tonnes of onions were lost in rains due to lack of proper storage facility. Despite these setbacks, 8 tonnes of onions were sold, generating ZMW 64,000 (USD 3,555) for the farmers.
- **In their second irrigated season** (Sep '23), although the price of onions had reduced, the farmer groups more than tripled the yields and ensured there were

Farmer earnings increased across two irrigated seasons (2023) compared to rainfed (2022)



no losses. The set of four farmer groups harvested 50 tonnes of onions (compared to 15 tonnes in the previous irrigated season), leading to an additional ZMW 350,000 (approx. USD 19,444) of sales income for the farmers.

- As a result, by cultivating on just four hectares of land (one hectare per farmer group), the four farmer groups generated revenues from the two irrigated seasons in Year 1 that were almost 1.6 times greater than revenues generated, from a far larger area of land, in the rainfed season in 2023.

Partner impact

Melina Banda is a farmer and mother of four who has seen massive changes in her life as a result of the project.

“The big difference onions have made is receiving money in a time of year when one does not expect to receive money. This was the first time in my life to make money in rainy season. Previously, after April and May when we harvest field crops, we had nothing to do but just stay waiting for rains. But now we are busy all year round working in our onion field.”

Key learnings

- **Business model:** The financing model, which included a borehole through a Joint Liability Group model, is ideal for contract farming or demand aggregation companies. Use of historical credit history helps select borrowers with adequate creditworthiness, and offtake agreements minimise defaults by allowing loan repayment deductions. Using the same selection criteria, since April 2024 GNA has extended the model to 31 additional farmers and recognises the model as a key solution to grow high-value crops at scale.
- **Grower rating:** GNA’s success relies on a viable ‘Grower Rating’ for each borrower, based on six data points: 1) Quality of crop delivered, 2) Quantity of crop delivered, 3) Side-selling and repayment ratio, 4) Attendance at training, 5) Adoption of best practices, and 6) Rating from the Farmers’ Private Extension Agent.



Image credit: Good Nature Agro, Zambia, 2023, PREO

- **Water flow risks:** Re-drilling due to inadequate water flow was a key financial risk. GNA mitigated this by engaging a specialised consultant for extensive site evaluation and selection studies.
- **Storage challenges:** Initially, GNA’s storage facilities were inadequate, leading to crop waste during the first irrigated season. Investments in storage facilities like onion dryers and cold rooms are seen as a permanent solution.
- **Commitment fee:** The 30% deposit required for onboarding was considered high by farmers, preventing all 8 groups from being onboarded at once. GNA’s management decided to lower the commitment fee or explore alternative models where no fee is required.



Heifer International

Financing dairy co-operatives to overcome barriers

Heifer International

Heifer International is a global nonprofit, founded in 1944, dedicated to ending hunger and poverty through sustainable, community-based interventions. By providing livestock, training, and resources, Heifer helps families become self-reliant, impacting millions of families in over 21 countries. Heifer International started work in Uganda in 1982 and has supported more than 932,000 families in Uganda since then.

Heifer Impact Capital is the investment arm of Heifer International, focused on creating/improving income opportunities for people living in poverty. Using a variety of investment vehicles to generate impact and positive financial returns, it provides affordable investment capital to farmers and co-operatives supported by Heifer International.

Economic progress of 2.5 million households closely linked to the sustainability of dairy producer organisations

Producer organisations or dairy co-ops (co-operatives) play a critical role in the milk value chain. They set up Milk Collection Centres (MCCs), serving the dairy farmers living within 10 km of the MCC. Through the MCCs, the producer organisations collect milk from farmers, conduct quality tests and ensure access to the market by selling the milk to dairy processors. This institutional arrangement provides smallholder farmers in rural areas with a predictable, long-term opportunity to earn a sustainable income, as well as access to training and other associated goods and services. The sustainability of producer organisations has a major impact on the lives of farmers who rely on them.

Producer organisations spend 40% of their monthly costs on diesel to run off-grid MCCs

On-grid MCCs use the grid as the primary source of power, with diesel generators providing backup for milk chilling during power outages. However, in Uganda more than half of the collection centres are off-grid, relying solely on diesel generators for power. In both cases, the running costs of diesel-powered generators represent up to 40% of the producer organisations' operational budget, reducing their profitability and the income of smallholder farmers. Inadequate cooling also leads to milk losses and poor-quality milk, which is then sold at lower prices on the open market, resulting in revenue losses of 5-10%.

Renewable energy can be a viable alternative, but high upfront CAPEX and perceived technology risks are key barriers

The dairy value chain and the case to power MCCs in off-grid areas is a perfect illustration of the need for the type of business model innovation that PREO supports. The solar system technology used is largely proven and widely available. However, the penetration of this market by Distributed Renewable Energy (DRE) companies is hindered by:

- High upfront investment costs, making initial deployment of renewable solutions less cost-competitive compared to the initial costs of diesel generators.
- Lack of appropriate financing mechanisms in rural areas to support solar development and promotion, with available financing being expensive and not tailored to rural groups of farmers.
- Limited awareness of the viability of solar for productive use in the dairy sector.

Heifer's lease purchase model offers access to solarisation at zero downpayment

With support from PREO, Heifer Impact Capital designed and piloted a lease purchase product for dairy producer organisations to solarise their MCCs, while Heifer International led on customer awareness and acquisition. Under this model, the dairy co-operatives are extended a 10- or 20-year lease term with fixed quarterly lease payments, 1-year moratorium and an option to buy out the entire system at any point during the term. The lease plan was backed by support that mitigated technology risks and protected the leased asset.

The PREO grant supported the development of this lease product by covering the costs incurred in product development and customer acquisition. In addition, the PREO grant contributed to a modest 10% capital subsidy. The lease product was piloted to solarise 3 MCCs with chillers of 8,000-12,000 litres each. Early data collected indicated that the producer organisations were benefiting from operational efficiency and could make lease payments from the cost savings.

Results indicate strong financial viability of the lease product, with attractive payback of less than 3.5 years

Taking the case of the Migina MCC of the Dwaniro Dairy & Livestock Farmers Co-operative Society Ltd, key outcomes observed included:

Reduced fossil fuel use and energy cost savings:

Based on the 6-month data collected after transition from diesel generators to solar, Migina MCC experienced significant reduction in fuel use and associated energy cost.

- Diesel consumption dropped by 93%, with several consecutive months recording zero consumption of diesel. The generators are only run during planned downtime of the system for maintenance/repair. The diesel that would otherwise have been used would have generated approximately 62 tonnes CO₂e per year²⁴ CO₂e. This reduced fuel use resulted in a 49% cost saving for the co-operative.
- Had the dairy co-operative self-financed the installation, it could achieve a payback period of less than 3.5 years, from the fuel savings alone.

Reduced losses from poor-quality milk.

Since the solar system was installed at the Migina MCC in June 2023, the co-operative successfully chilled 1,274,742 litres of milk (value USD 323,642) over a 7-month period, without any losses, thanks to the consistent availability of power. This stands in stark contrast to the period before the solar system installation, when the co-operative suffered monthly milk losses worth USD 2,653 due to generator breakdowns.

More reliable milk chilling benefited farmers by reducing uncertainty about getting their milk to market. More reliable energy for milk chilling improved the ease of getting milk to market for the farmers supplying the MCCs. According to interviews with farmers affiliated with Dwaniro Co-operative, more reliable power has improved the confidence of farmers that they will be able

to sell milk to the MCC, which then sells it onward to the dairy processor.

Increased chilling capacity of Migina Milk Collection Centre. The co-operative registered a 22.6% increase in milk suppliers, going from 164 to 212 farmers in just 5 months. This led to a corresponding increase in the volume of milk collected, chilled, and sold to the processor, rising from 536,215 to 541,206 litres.

The project's demonstration effect is already accelerating the Ugandan ecosystem for renewable energy adoption in the dairy sector

The project played a key role in overcoming trust and coordination challenges among dairy co-operatives, financial institutions, and technology providers. It has

Image credit: Heifer International, Uganda, 2023, PREO



²⁴ Based on a conversion of 2.74 kg of CO₂ per litre of diesel.

created a strong demonstration effect. This PREO project is expected to have a far-reaching impact in encouraging renewable energy adoption in the Ugandan dairy sector. For example:

Stimulating demand for solar PV systems among dairy co-operatives. The project directly increased awareness of the potential benefits of solar among initially sceptical dairy co-operatives. This scepticism was especially due to concerns about poor quality equipment and engineering design and installation (which have been a problem for some commercial solar projects). Heifer's provision of technical oversight and financial structuring was crucial in convincing co-operatives to invest, influencing others to consider similar systems. As a result, 13 co-operatives have formally applied for solar systems, with more expressing interest.

Stimulating financial innovation to expand access to affordable finance to facilitate the scale-up of similar projects. With the evidence generated by the project, Heifer further engaged with financial institutions that finance agribusinesses and renewable energy projects, particularly Stanbic Bank Group and Uganda Development Bank (UDB), to develop bespoke financing mechanisms.

Advancing government policy to improve the enabling environment for PURE. The project's engagement with the Ministry of Energy and Mineral Development (MEMD) has helped to advance

government policy in favour of enabling off-grid renewable energy technologies to meet specific energy needs. The project has influenced government thinking on the use of renewable energy not just in the dairy sector, but across other sectors as well.

Linking renewable energy companies with specific opportunities in the dairy value chain. The project has made renewable energy service providers, as well as Engineering, Procurement, and Construction (EPC) firms, more aware of new business opportunities within the dairy value chain.

Key learnings

- Extensive engagements with co-operatives were needed to explain the financing product and win over their interest. Several meetings and consultations were essential to agree on scope and ensure suitability for the co-operative's needs. A combination of extensive O&M contract, insurance policy and remote monitoring systems were instrumental in mitigating any perceived technology risks.
- The involvement of multiple stakeholders - Heifer International, Heifer Impact Capital, contractors, and co-operatives - underscored the complexity of collaborative decision-making processes. Consistent follow-ups and adaptive project management were pivotal in overcoming these challenges, highlighting the importance of flexible and transparent contracting frameworks in facilitating innovative solutions.





Koolboks

Asset financing solar refrigerators

Koolboks

Koolboks is a solar-powered refrigeration company established in France in 2018 by Nigerian-born CEO Ayoola Dominic, in collaboration with Deborah Gael, from France. Koolboks products are used by small businesses that rely on refrigeration for daily income generation through sales of a range of food products including ice cream, soft drinks, fish and meat.

Challenges of preserving fish stocks

Fish traders in Nigeria (over 90% of whom are women²⁵) face significant challenges in preserving their stock. The unreliable grid electricity supply and the high cost of backup diesel generators render traditional refrigeration methods ineffective. As a result, approximately 30% of their stock spoils due to inadequate cooling, leading to financial losses and increased stress for these entrepreneurs. Moreover, for those who can access cooling, diesel-powered refrigerators are not only costly to run and maintain but also are harmful to the environment.

Koolboks endeavoured to address the Nigerian fish traders' challenges by providing sustainable cooling solutions to empower women entrepreneurs. The company developed Koolhome, an off-grid solar-powered unit that serves as both a refrigerator and freezer. This innovative technology can maintain a cool temperature for up to four days, even without power or sunlight. The units also feature LED lighting bulbs and USB ports for mobile phone charging.

Building a successful direct customer sales model

Having started in 2020, Koolboks quickly expanded to 14 countries and by 2021 had sold more than 1,000 units business-to-business, but did not have a direct-to-customer sales model. In 2021, Koolboks was awarded PREO funding to pilot and demonstrate a model for direct customer sales to Nigerian fish traders.

Initial attempts to partner with a Nigerian financial institution for consumer financing had faced challenges, due to borrowers' limited credit history and lengthy approval processes. With PREO funding for this project Koolboks validated the market fit, devised a customer acquisition strategy, and used the grant to facilitate financing for sales. Within nine months, the company sold 219 units in Nigeria through a lease-to-own model,

with a high on-time repayment rate. This successful pilot spurred private investors to commit to USD 2.15 million of Series A funding in 2022, recognising the direct customer model's potential. Although originally drawn to the B2B model, these investors now support the direct-to-customer approach, pledging follow-on financing and identifying it as the primary growth driver.

In a recent interview with the Chief Business Officer at Koolboks, Natalie Casey, she stated that:

“Despite initial concerns about the risks associated with shifting our strategy, we now balance distribution partners [B2B] and direct customer sales [B2C]. Notably, 70% of sales are now direct, coinciding with a staff increase from 11 to 219 in Nigeria since our January 2022 seed round closure.”

Overcoming adoption barriers

Koolboks implemented various strategies to overcome adoption barriers, including:

- **Market activations:** Launching extensive market activation campaigns to reach potential customers and raise awareness of the benefits of solar-powered refrigeration.
- **Flexible payment plans:** Including monthly, weekly, or daily instalments, increasing product affordability and accessibility to low-income entrepreneurs.
- **Customer education and empowerment:** Providing comprehensive product manuals and conducting training sessions about how best to use the products and outlining the associated long-term financial and environmental benefits.
- **R&D investment:** Investing in research and development to continuously improve product quality and functionality, ensuring customer satisfaction.

²⁵ Kazeem et al. Applied Studies in Agribusiness and Commerce (2021) vol. 15(1-2), pp. 19-26; Yisa et al. International Journal of Fisheries and Aquaculture (2011) Vol. 3(9), pp. 180-183

Customer testimonial

Kehinde Fayemi is the manager of a frozen food shop in Lagos State. Before acquiring her Koolboks solar-powered refrigerator, she faced issues with unreliable electricity, leading to food spoilage and financial losses. Kehinde has highlighted how her new Koolhome has improved her business, drawing in new and returning customers with the freshness of her produce.

“It brings more customers to my doorstep. Even if I’m not around, they would wait for me,” she explains, adding that one day she returned home to find a crowd of people outside her shop. “I can sell my goods at the price I want. I don’t have to sell it at a lower price for fear of spoilage.”

Moreover, Kehinde stated that she also feels more respected in her community:

“Customers used to look down on my produce and price the goods low because it was defrosted,” she adds. She has now become an advocate for the freezers, recommending Koolboks to others, with positive results. “I have other traders hug and thank me for introducing them.”

Koolboks’ future ambitions

- The company is currently investing heavily in its back-end infrastructure. For example, an IoT platform will facilitate remote monitoring of equipment, enabling efficient troubleshooting and faster response times for remediation works. This will enhance the company’s ability to address issues promptly and minimise downtime. Such behind-the-scenes developments will help Koolboks develop the robust and efficient operations processes which are essential for future growth.
- Koolboks is also moving towards localising as much of its supply chain as possible. This will improve reactivity to local markets and reduce exposure to fluctuations of the Naira foreign exchange rates (many components are currently imported, and paid for in US dollars).
- The company is exploring opportunities to enter new markets/regions across Africa (such as Uganda and Kenya), with support from Beyond Grid Fund for Africa (BGFA).



Image credit: Koolboks, Nigeria, 2022, PREO

Key learnings

- Direct-to-customer sales model proved highly effective, demonstrating the importance of adaptable business strategies in emerging markets.
- Flexible payment plans significantly increased product accessibility for low-income entrepreneurs, resulting in a 97% on-time repayment rate.
- Customer education and empowerment were crucial in overcoming adoption barriers and ensuring long-term product satisfaction.
- Continuous investment in R&D to improve product quality and functionality was key to ensuring customer satisfaction and the long-term viability of the business model.
- The solar-powered refrigerators had a broader socio-economic impact beyond business improvement, enhancing traders’ social status and bargaining power within their communities.
- The project revealed the importance of overcoming initial adoption barriers through a combination of strategies.



SokoFresh

Becoming a one-stop-shop
for rural farmers

SokoFresh

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SokoFresh

SokoFresh was set up in 2019 to address the post-harvest management gaps present in the horticultural value chain in Kenya. The idea was first conceived following an issue analysis conducted by venture capital firm, Enviu. Enviu’s report²⁶ revealed the fragmented nature of the agricultural value chain, particularly in hot environments, which can prevent a staggering 50% of horticultural produce from making it to market. Such a high percentage of produce being lost post-harvest inevitably has negative knock-on financial effects on the farmers and food security in the local areas, as well as contributing to greenhouse gas emissions.

The need for a business model to enable the provision of cold storage for farmers

The key market failures found in the horticultural value chain were a lack of access to cold storage and to markets, which meant that produce was spoiling quickly and farmers were losing out on potential income. As was the case for the Heifer International project, the technology was available to create a chain of cold storage from harvest to market, from which smallholder farmers could capitalise. The problem lay in making a business model viable for off-grid, low-income smallholders. In addition, the technology needed to become more accessible, reliable and affordable before it could make significant and sustainable impact.

80% of horticultural produce in Kenya is produced by smallholder farmers²⁷, so they quickly became a key market for SokoFresh. Smallholder farmers tend to be off-grid or have access only to unreliable grids; furthermore,

they may be short on cash. This means they can struggle to invest in efficient aggregation and the necessary logistics to ensure they are getting the highest price possible for their produce.

SokoFresh’s solution to reduce post-harvest losses

PREO funding enabled SokoFresh to pilot solar-powered cold storage-as-a-service, alongside a digital market linkage platform to engage and integrate small- and medium-scale farmers with professional value chains. The pilot enabled the showcasing of two storage units and the linkage platform. To identify the best technology partner for the cooling system pilot, SokoFresh reviewed the technical performance and financial proposal from over 12 different technology providers. Then, when looking to recruit farmers and buyers, SokoFresh partnered with local organisations which already worked with or had access to networks of farmers to which SokoFresh could pitch.

SokoFresh provided an all-in-one service for farmers in Kenya and fostered a 100% traceable supply chain. It assisted farmers with the harvesting, weighing and measuring of produce before it was transferred to a solar-powered cold storage unit, from where SokoFresh linked the produce to a professional market and transported the produce to it. To ensure the farmers aren’t left without income while waiting for SokoFresh to sell on their produce, the farmers were paid at the point of harvest and storage in the cold units. Then, after SokoFresh had transported and sold the produce, its fee was subtracted from any profit made at the market before the additional income was sent back to the farmers.

Cold storage + market linkage

Delivered as a service, these drive adoption of cold storage among smallholder farmers



Farmers alert SokoFresh they have produce ready for harvest



SokoFresh activates harvesting, and aggregates in cold storage



Once aggregated, SokoFresh transports the produce to the buyer / buyer collects produce from cold storage



Buyers receive the produce and make payment in full



SokoFresh pays the farmer after deducting:
1. A cold storage fee of USD 0.02 per kg
2. A market linkage fee of 10%

²⁶ <https://foodflow.enviu.org/2024/09/25/post-harvest-loss-issue-analysis-2019/>

²⁷ <https://www.preo.org/project-news/from-pilot-to-scale-how-sokofresh-is-making-cold-storage-more-accessible-for-thousands-of-low-income-farmers/>

This cooling-as-a-service model avoided farmers having to incur the upfront costs of investing in the infrastructure, making it a much more accessible and affordable model for many. The portable nature of the cold storage units was vital in enabling SokoFresh to access the market, allowing relocation to many different locations across Kenya based on produce seasonality. As a result, the company established a high potential for impact year-round.



Image credit: SokoFresh, Kenya, 2022, PREO

SokoFresh also works on a B2B business model after identifying demand for cold storage units to be leased out to value chain players. These include exporters and agro-processors, who work with smallholders. This requires the cold storage unit to be customised to value-chain-specific parameters to ensure optimal temperatures and humidity. However, with the B2B model, the onus is on the client to manage the cold storage themselves.

The company has onboarded over 14,500 farmers since the 2020 pilot project; the results have been remarkable. The farmers' income has increased by 20% on average and they have seen a significant decrease in food waste. Following the success of this pilot, SokoFresh has scaled

its business and is now on its way to owning nine cold storage hubs.

Looking ahead

Now going from strength to strength, SokoFresh was selected by a panel of industry experts as the winner of EEP Africa's 2023 Project of the Year in the Scale Up category. SokoFresh aims to continue to secure investors and partners to expand its reach. The company is interested in forming strategic alliances with entities interested in aiding small-scale farmers and enhancing the efficiency of horticultural supply chains within the country. SokoFresh has already established fruitful partnerships with groups like the One Acre Fund and TechnoServe, among others. In addition to this, SokoFresh has continually updated the technology behind the cold storage units by working with Ecozen to upgrade the units from 5kW peak to 7kW peak. This has allowed the company to deploy and serve more farmers and value chains. SokoFresh continues to respond innovatively to challenges, for example by designing a finance model to smooth the capital expenditure burdens on the business during its scale-up phase.

Key learnings

- **Optimising processes for harvesting, storing and arranging logistics is of critical importance for success.** For example, SokoFresh once aimed to supply mangoes to an exporter, but 90% of the produce was rejected by them, due to being over-mature. SokoFresh had to act quickly to avoid produce waste, activating sale within the retail market (rather than export). SokoFresh now helps the farmers put more processes in place to identify which crops are ready to be harvested and to reduce the transfer of disease, before the produce enters a cold storage unit.
- **SokoFresh's pilot has boosted smallholder farmers' income.** As mentioned above, before SokoFresh's pilot, the Enviu analysis found that 50% of horticultural produce was lost post-harvest, never making it to market. For its customers, SokoFresh has reduced post-harvest loss to as low as 2%, increasing smallholder farmers' income by 20% on average. To date, SokoFresh has traded over 5,000 tonnes of produce through its market linkage service.
- **Increased income had wider impacts for farmers:** For example, Lucy Kiara, a farmer and customer of SokoFresh said, "after selling the avocados through SokoFresh, I was able to buy a water pump. There is now water supply in my whole house".

Conclusion

The integration of Productive Use of Renewable Energy (PURE) technologies into agriculture in sub-Saharan Africa represents a pivotal opportunity to transform the sector. The key to unlocking widespread adoption lies not just in the technologies themselves, but in the innovation of business models. Business model innovations directly address the core challenges such as high upfront cost and limited access to financing for the farmers, long customer acquisition cycles, and the need to expand the target market for the distributors.

Investment in business model innovation has been proven to accelerate uptake in other sectors as well. A notable example is the rapid success of M-Pesa²⁸ mobile money services in East Africa. While the underlying technology was crucial to M-Pesa's success, other mobile money service providers had existed before M-Pesa. What set M-Pesa apart was its comprehensive approach to making financial services accessible, affordable, and trusted by a previously underserved population. This required building a ubiquitous agent network, designing a pricing model attractive to low-income users, focusing on women and other marginalised segments, simplifying the user interface, and partnering with a range of stakeholders including the Central Bank of Kenya.

By rethinking traditional approaches to product delivery, financing, and customer segmentation, PURE companies can significantly lower the barriers to adoption. The success stories of the PREO-supported companies discussed in this report vividly illustrate this point; innovations have made PURE technologies more accessible and attractive, leading to faster and wider adoption.

This acceleration is vital. As PURE technologies become more embedded in agricultural practices, their benefits - such as increased productivity, reduced post-harvest losses, and improved food security both locally and globally - will become more evident. This also supports the need for more donor and development capital, not just for scaling businesses, but to catalyse a broader transformation in agricultural practices in countries across SSA. By supporting the adoption of PURE technologies through strategic investments, we can assist farmers fully to harness the agricultural potential of the land, delivering greater food security and income generation. This paves the way for a more sustainable and prosperous future for all.

Image credit: Good Nature Agro, Zambia, 2023, PREO

²⁸ <https://www.m-pesa.africa/>





Powering Renewable
Energy Opportunities



Image credit: Good Nature Agro, Zambia, 2023, PREO

