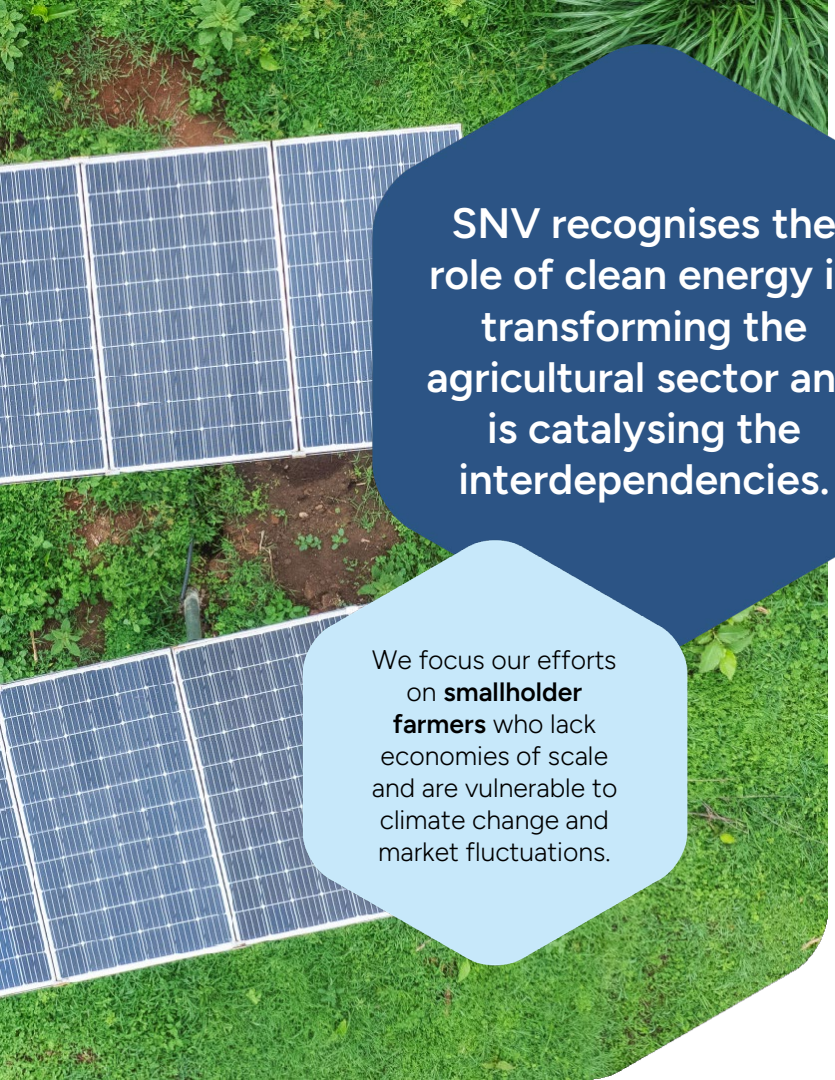
PURE x Agriculture

A snapshot of SNV's work and learnings.

January, 2025



SNV recognises the role of clean energy in transforming the agricultural sector and is catalysing the interdependencies.

We focus our efforts on **smallholder farmers** who lack economies of scale and are vulnerable to climate change and market fluctuations.

INTRODUCTION

Renewable energy is critical for the sustainable development of agricultural value chains.

Energy access restrictions and low availability of energy.

Unreliability of energy and high costs from conventional sources.

Low energy affordability by smallholder farmers.

POTENTIAL OF PURE IN AGRICULTURE

Energy efficient, needs-based PURE solutions can:

Improve productivity and quality of production.

Enable diversification and increase incomes & savings.

Eliminate drudgery and improve farmer livelihoods.

SNV's initiatives are focused on strengthening the demand and supply ecosystem for PURE-Agri interventions.

SNV conducts on-the-ground research to inform its programmes.

Research is carried out from macro and micro perspectives in partnership with local organisations.

We approach problem solving by identifying challenges as well as opportunities.

We dive into country contexts to identify solutions and their ecosystem conditions.

ON THE GROUND RESEARCH - EXAMPLE

SNV's SEFFA programme conducted a study that assessed PURE opportunities in Agriculture across Ethiopia, Uganda and Kenya

SNV conducted a survey of 570 dairy and horticultural producers in each of the three countries.

The study analysed the maturity of different agricultural solutions in the PURE sector.

Willingness of financial institutes, and existence of payment modalities.

Positive investment outcomes.

Interest in technology and its suitability.

Knowledge on how to apply technologies.

Willingness and ability of enterprises to provide and repair technologies.

Country-level opportunities identified:

	Horti-culture	Dairy
Irrigation	Ethiopia, Kenya, Uganda	Ethiopia
Cooling	Ethiopia, Kenya, Uganda	Ethiopia, Kenya
Processing	Ethiopia, Kenya, Uganda	Ethiopia, Uganda

ON THE GROUND RESEARCH - EXAMPLE

SNV's SEDP project conducted an in-depth assessment for dairy processing and off-grid technologies for poultry farmers in Ethiopia.

The study focused primarily on solar-powered butter churners, cream separators, and heating systems, and found:

High interest for solutions.

Low capacity and underdeveloped markets.

Supply & manufacturing

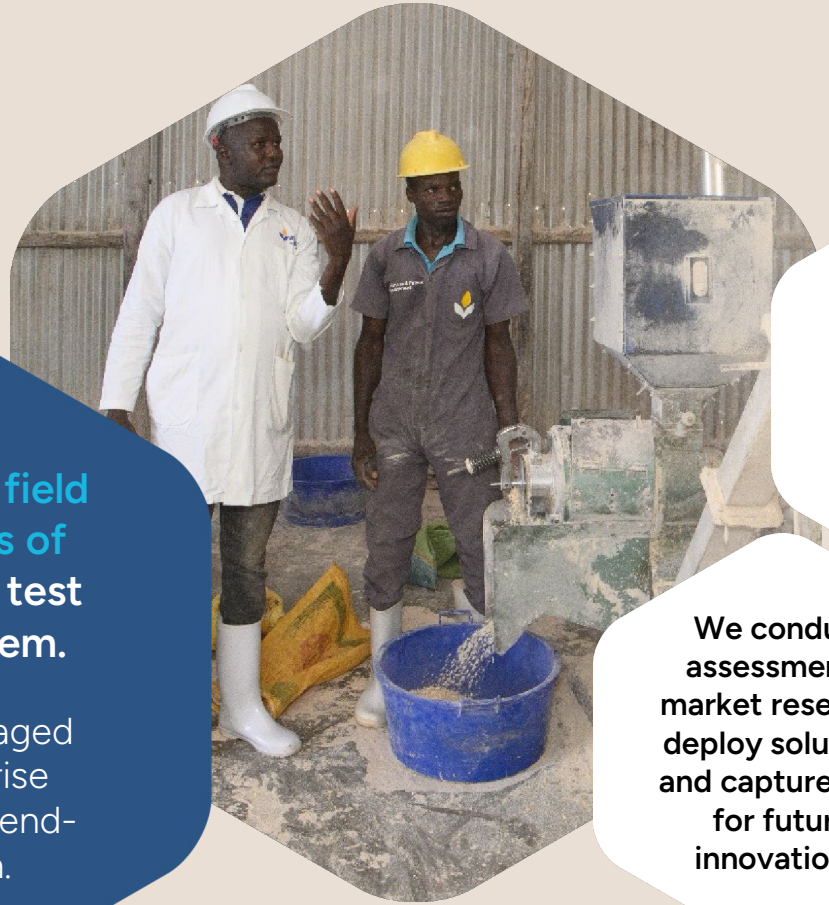
Locally made equipment is not always suited and imported equipment faces challenges with spare parts and qualified technicians.

Extent of distribution

There is poor regional presence outside Addis as **machine suppliers perceive low demand and solar suppliers feel funding constraints.**

Financial linkages

There is poor access to foreign currency needed to ensure a stable supply of mostly imported and expensive to obtain technologies.



SNV carries out field demonstrations of technologies to test and validate them.

Pilots are encouraged via local enterprise support or direct end-user outreach.

We prioritise testing of solutions not otherwise demonstrated in the region.

We conduct assessments, market research, deploy solutions and capture data for future innovations.

Overview of the different types of PURE-Agri technologies tested and scaled by SNV across contexts.

TECHNOLOGY TESTING & FIELD DEMOS - EXAMPLE

SNV partnered with Ntakye in Uganda to test solar-powered milking machines for farmers in off-grid areas.

Ntakye, an agri-business, works with smallholder farmers to improve dairy farming activities. Here is how Ntakye's milking machines have benefited smallholder dairy farmers:

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Demonstration sites for solar milking machines in Uganda.

Prompt milking of cows and **timely delivery of milk** due to reliable energy.

Reduced labour needs for milking, while accomplishing more farm tasks.

Improved quality of milk with more efficient milk handling processes.

Ntakye is now innovating on smaller machines that are more efficient and over four times cheaper than imported alternatives.

However, improving access requires greater support:

Machines can be complex to operate and maintain, thereby requiring extensive trainings.

Machines are costly, even with an 80% subsidy.

Machines were imported from India. Ntakye faced delays in sourcing spare parts.

Greater awareness needed to address cultural preferences for hand milking.

TECHNOLOGY TESTING & FIELD DEMOS - EXAMPLE

In 2023, SNV partnered with Awelo Millers to install Energy-Efficient (EE) agro-food processing technologies at Awelo's existing mill in Uganda

Awelo Millers specialise in producing organic rice, maize and flour, sunflower oil, groundnut paste, as well as laundry products like liquid and bar soap.

They previously used diesel engines to power their processing facility. This was unsustainable and loss-making, with an average **energy expenditure of €588 per month.**

PURE and EE technologies installed at Awelo Millers :

- **Solar collapsible dryers** for drying grains.
- Two additional **25Hp and 10Hp energy-efficient motors** for milling.
- **Turbo ventilators** for cooling the processing area.
- **Other energy conservation practices.**

EE processing services now benefit 1,200 farmers in the region.

- **50% reduction** in monthly energy expenditure.
- Increased **business profitability.**
- **Higher process efficiency** and improved quality of end products.

TECHNOLOGY TESTING & FIELD DEMOS - EXAMPLE

SNV has been working on the development of the biodigester market in different countries.

In Zambia, the focus is on climate resilience of SHFs with biogas as clean renewable energy and bio-slurry as high value fertiliser.

Biodigesters play a crucial role in:

- **Enhancing soil fertility and soil health** through the application of bio-slurry, a co-product of biodigesters.
- Providing a **sustainable, clean energy alternative** without indoor air pollution for clean cooking and/or lighting.
- Improving farm and family hygiene through **improved manure management and toilet connection to biodigester.**
- **Reducing drudgery and increasing time savings** for women, girls, and children.
- **Reducing deforestation and greenhouse gas (GHG)** emissions through replacement of fuel wood.

As part of SNV's INCREASE programme in Zambia, the biodigester market was developed by pursuing two trajectories:

A.
Value Chain (VC) Company as an intermediary for CS products and services.

VC-Companies can **buy in bulk from Biodigester Construction Enterprises,** thereby reducing cost for SHFs and stimulating the market. They can **bargain on the installation and material charges,** while ensuring quality service.

B.
Support to Zambia National Biogas & Alternative Energy Association.

SNV builds the capacity of ZARENA to further develop the biodigester market.

SNV develops innovative business cases and financing models for PURE-Agri technologies.

It enables solution uptake by linking financiers, end-users and enterprises.

We test new business cases for PURE technologies in nascent markets.

We work with financiers to scale PURE solutions with existing, proven business cases.

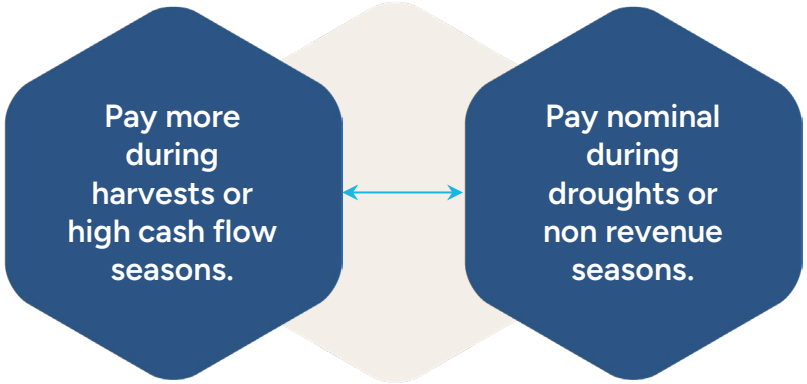
FINANCE & BUSINESS CASE DEVELOPMENT - EXAMPLE

SNV, in collaboration with a local Kenyan distributor, piloted a Pay-As-You-Go (PAYG) business model tailored to the seasonal cash flows of farmers.

The PAYG model served to increase the adoption of solar water pumps (SWP) across Kenya.

Farmers can now access PURE-Agri technologies.

Farmers can pay flexibly to afford the technology with no fixed term interest.



↑ Increased farmer affordability.

↓ Reduced upfront investments.

↓ Reduced market barriers in accessing irrigation technologies.

Similarly, SNV partnered with FRES Uganda Ltd. to develop an Energy-As-A-Service business model to pilot solar powered deep freezers.

FRES Uganda Ltd. implemented the EaaS model to curb the problem of high upfront investment costs and to increase last-mile end-users' access to PURE technologies.

The model gives users the flexibility to use and pay for the system based on their existing needs.

Old systems can also be recycled to promote circularity.

Beneficial for users not interested in owning the system.

53 SHFs gained access to PURE dairy cooling technology through this model.

For the pilot, FRES Uganda Ltd. was focused on testing the EaaS model by powering deep freezers at both the manufacturing facility and farm levels.

FRES Uganda Ltd. takes the risk of procuring, installing, maintaining, and owning the entire PURE solution.

Farmers pay a one-off installation fee and monthly service fee as per their energy needs.

FINANCE & BUSINESS CASE DEVELOPMENT - EXAMPLE

SNV partnered with Rwanyamahembe SACCO, a local financial institution, to develop a solar loan product for SHFs to access PURE technologies in Uganda.

Financial challenges faced by smallholder farmers:

Limited access to credit	**High annual interest rates up to 36%**	**Stringent collateral requirement**	**Limited tech distribution to last mile**

Features of the solar loan product include:

- **Low interest rates @1.5% for groups & individuals @1% for dairy cooperatives.**
- **Fast loan processing (3-4 days) and 1 month grace period.**
- **Solar system as collateral along with group guarantee.**
- **Subsidised loan charges for PURE.**

113 SHFs availed the solar loan for dairy cooling in 8 months.

Through the loan, Akajumbura Dairy Farmers Cooperative, could upgrade their solar system from 14kWp to 20kWp.

SNV prioritises training and capacity building of farmers and ecosystem enablers.

SNV works closely with training institutions and vocational schools to build ecosystem capacities.

We carry out trainings, focusing on priority agricultural sectors.

We build capacity with multiple actors to adopt and help scale PURE Agriculture initiatives.

TRAINING & CAPACITY BUILDING - EXAMPLE

SNV built the capacity of value chain actors to successfully operate SWP-led irrigation solutions for SHFs in Ethiopia

SNV devised support mechanisms, built capacities of various ecosystem actors, and catalysed cross sectoral partnerships.

Technical assistance in the design, installation, and operation of SWP.

On-the-ground interactions for problem identification and solving.

Business trainings on the O&M of technologies, and good agronomic practices.

Targeted awareness and behavioural change campaigns.

Tools employed to create awareness and trigger demand:

Workshops, exhibitions, field visits, social media and other digital channels, print media, training materials in local languages.

Cross sectoral complementarity and adoption of SWP technologies:

Ministry of Agriculture, Ministry of Water and Energy, regional agriculture bureaus, Financial Institutions, SWP technology suppliers and SHFs.

TRAINING & CAPACITY BUILDING - EXAMPLE

SNV builds awareness of PURE-Agri solutions and strengthens the capacities of ecosystem actors.

SNV, with local partners, delivered trainings to dairy VC actors in Uganda to increase SHFs' access to PURE-agri technologies.

Dairy best practices

Knowledge sessions co-facilitated by **Dairy Development Authority** on milk quality assurance, animal nutrition, feed resources and payment systems.

Awareness on PURE technologies

Electronic media (TV and radio) run over 12 months, including talk shows at major stations in Uganda.

Business development

Training sessions on **record keeping, costing & budgeting and overall business planning** to operate and manage business profitably.

Operations & Maintenance

O&M training on solar milking machines and dairy cooling technology for **optimal utilisation of equipment.**

Multi Stakeholder Platform (MSP)

Establishment of an MSP that enabled partners and VC actors to directly engage with farmers and receive feedback.

Market linkages

Technical guidance to **acquire certification from the Uganda National Bureau of Standards,** and open access to premium markets.

TRAINING & CAPACITY BUILDING - EXAMPLE

SNV provided trainings to end-users in Ethiopia on energy system maintenance and agri-business best practices.

Scale and geographic barriers prevented the PURE technology distributors from training end-users on O&M of the technologies. Access to spare parts was another challenge faced by the suppliers.

SHFs in the dairy and poultry sectors were provided with trainings on:

Solar system training

System maintenance and troubleshooting training from the solar system installer.

PURE equipment & business training

Training on operation of PURE-Agri technologies.

Guidance on **proper dairy and farm management** practices and marketing strategies.

Data collection & reporting

Training to accurately and consistently **document data.**

Provision of templates for streamlined data recording.

Future sustainability of systems can be ensured if:

End-users know how to accurately operate the systems.

End-users have resources and knowledge to address faulty systems.

SNV builds stakeholder networks and engagements at different levels of the ecosystem.

We engage at local and regional levels for sharing knowledge and learnings.

We partake in critical national consortiums and networks for aiding PURE-Agri access.

STAKEHOLDER NETWORKS & ENGAGEMENTS - EXAMPLE

SNV, in collaboration with the Ministry of Energy & Mineral Development and other partners, established and operationalised the Energy Efficiency Accelerator Network (EEAN) in Uganda in 2023.

EEAN is a virtual platform to strengthen coordination, collaboration, and knowledge exchange amongst stakeholders.

Aim of EEAN:

Transform policies, regulations and practices.

Transform financing and markets for energy efficiency.

To solidify Uganda's commitment to energy efficiency and to showcase the power of collective action in driving sustainable energy solutions.

Key issues addressed by EEAN:

- Adoption of **minimum energy performance standards** for PURE technologies.
- Formulation and distribution of **specific energy efficiency regulations** for Uganda.
- Collaboration with **financial institutions.**
- Collection of **energy efficiency related data.**

STAKEHOLDER NETWORKS & ENGAGEMENTS - EXAMPLE

Establishment of National SWP Multi-Stakeholder Platform (MSP) in collaboration with Ethiopia Solar Energy Development Association (ESEDA)

SNV's work in Ethiopia facilitated the formation of the MSP to:

Share on-the-ground experiences, discuss challenges and solutions.

Advocate for a market-led approach for sustainable SWP interventions.

The SWP MSP, led by ESEDA, is tasked with coordinating with the technical committee to:

- **Finalise and compile the national SWP standard document.**
- **Validate test procedures.**
- **Seek endorsement of the standards for safeguarding investments and long-term reliability.**

Stakeholders include:

Public institutions
Financing companies
Private sector
Energy and agricultural experts
farmers.

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MSP sessions and panel discussions held in Addis Ababa, Hawassa, and Bishoftu.

STAKEHOLDER NETWORKS & ENGAGEMENTS - EXAMPLE

Enabling local stakeholder coordination for administrative support, value chain linkages, and regulatory support in Ethiopia.

Introduction of the project goals to **Ethio-chicken**, local primary supplier of day old chics across Ethiopia, **ensured that inputs were available to farmers on time.**

A women-led SME pilot site engaged in dairy processing was granted access to an existing processing facility by the local government.

Furthermore, the SME obtained formal registration and was able to streamline licensing processes via local authorities.

The active involvement of local administration is key to the successful implementation of a project and reducing time for regulatory approvals.

Collaboration with local country level suppliers is equally important to ensure unhindered supply chains and reach maximum production capacities.

To enable scale, SNV supports end-users and enterprises with tailored funding models.

Different types of grants are utilised to support enterprises that deliver solutions.

We utilise innovative financing models to provide targeted incentives to enterprises.

We design funds which help build technical & financial capacity of enterprises.

We design grants for end-users and enterprises to aid adoption of new & emerging technologies.

SNV designed a challenge fund to stimulate innovative ways of improving access to PURE-Agri technologies.

In one case, SNV partnered with PurposeBlack Ethiopia to pilot SWP irrigation for a group of farmers through a contract farming approach.

Farmers are shareholders of the company.

The Purpose Black Model

The company uses shares as collateral to get loans from financiers.

Leverage PURE-Agri technology, agricultural inputs & practices.

In another case, Ethio-Leap worked with SNV to showcase the feasibility of hydroponics in order to drive their franchise model.

Components of the hydroponic set-up:

- **Hydroponic growing beds**
- **Germination chambers**
- **Solar-powered generator**
- **Electrical installation**
- **Automation systems**

Ethio-Leap has set up a demo farm on a 360 m2 plot leased from smallholder farmers.

Ethio-Leap used the challenge fund to showcase the **feasibility of modern farming techniques** to SHFs via the demo farm.

FUNDING MODELS - EXAMPLE

SNV also established an innovation fund to accelerate new opportunities for PURE-Agri business cases across Kenya, Uganda, and Ethiopia

The innovation fund was aimed at providing financial support to early-stage technologies, foster innovation, and learnings.

This model has helped successfully pilot PURE solutions across countries & contexts:

- **Solar cold chain** to reduce post-harvest losses at the market level in Uganda.
- Replacement of diesel water pumps with **solar water pumps** for irrigation in Ethiopia.
- **Solar cooling as a service model** pilot for horticulture in Kenya.

Competitive grants were disbursed in cooperation with local and regional knowledge hubs, technical institutes, etc.

Small grants were disbursed to identify, support, and test viability of local innovative PURE business cases across technologies and sectors.

Special focus on youth groups and startups run by women.

SNV implemented a Results Based Financing (RBF) mechanism to incentivise enterprises in Kenya to promote the adoption of SWPs by smallholder farmers.

SunCulture is a local Kenyan solar-powered irrigation systems and services provider.

Through the RBF model, they were able to successfully demonstrate the benefit of SWPs to SHFs and increase access to technology across rural Kenya.

The funds were disbursed in 3 verification cycles and were used by SunCulture primarily for:

Setting up SWP demo kits at farmer trainings and agricultural shows.

SWP **installations, issue resolution and training** of farmers by technicians.

89% increase in the adoption of SWPs between 2022 to 2024.

Enhanced productivity, reduced costs and higher affordability for SHFs.

Demonstration to other community members.

Total amount of EUR 144,131 was awarded through RBF.

SNV also utilised RBF in Ethiopia to reward enterprises selling SWPs to smallholder farmers.

Through the RBF model, Hello Solar, a local solar energy provider, was able to pilot their PayGo system with the aim to make SWPs commercially viable, financially sustainable, and scalable.

The PayGo facility catered to the needs and cash flows of SHFs.

The RBF model had a multi dimensional impact:

Diversified Hello Solar's product range.

Created a new financial product for SWPs.

Reached out to 12 farmers for initial evidence creation.

50% of the SWP costs would be paid in advance with the remaining as PayGo.

HelloCash mobile banking service, would be used as the payment facility.

PayGo payments would be made **during harvesting cycles of farmers.**

Tenure for payment is **18-24 months.**

Hello Solar also shared its learnings with ecosystem enablers at the Global South South Summit '24, an event aimed at addressing poverty, climate change, and renewable energy gaps in Africa and India.

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