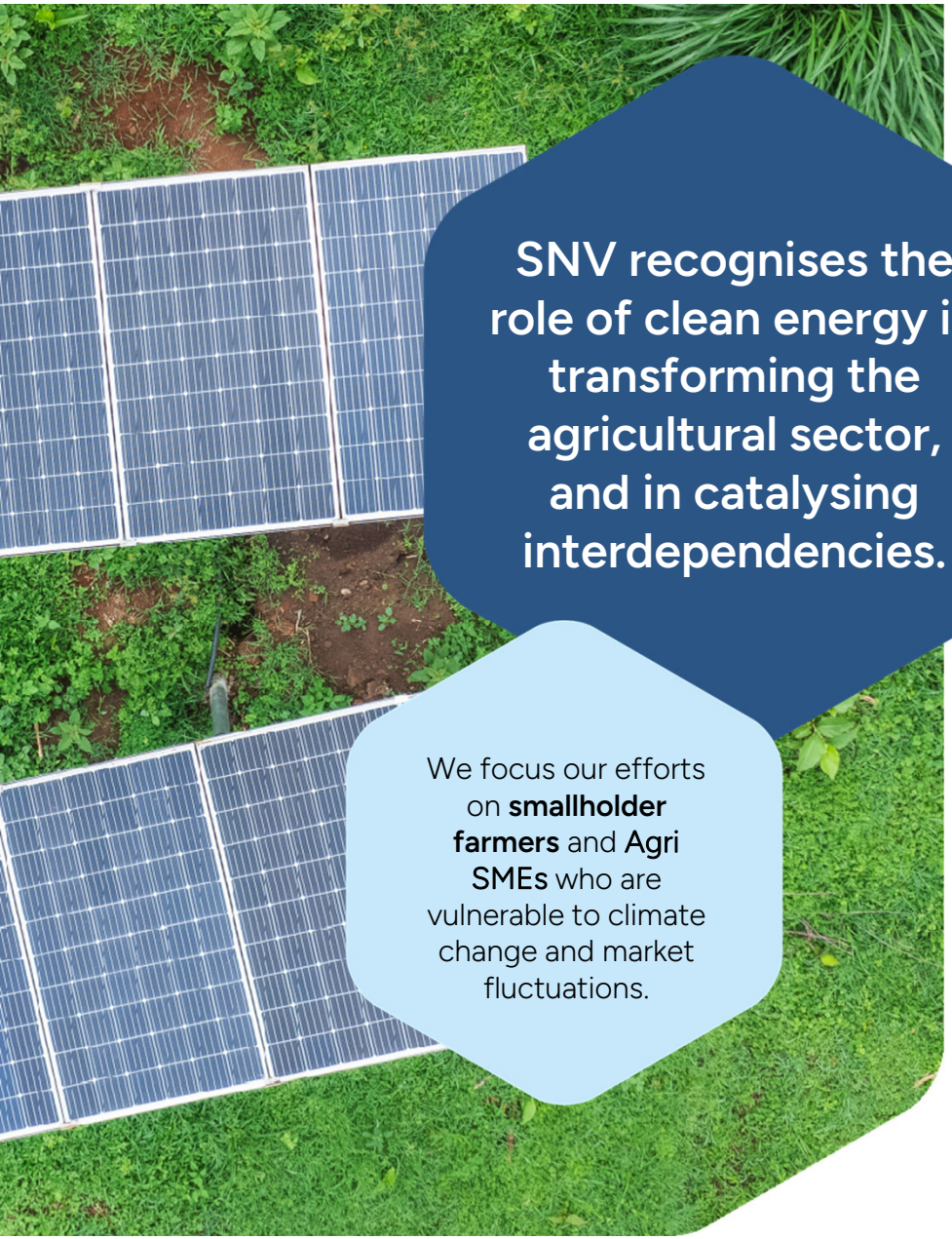
# PURE x Agriculture

## A snapshot of SNV's work and learnings
(Africa focus)

April 2026



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

We focus our efforts on **smallholder farmers** and **Agri SMEs** who are vulnerable to climate change and market fluctuations.

INTRODUCTION

## Renewable energy is critical for the sustainable development of resilient food systems.

Limited access, inadequate capital and tailored financial flows for supply and demand activation

Unreliability of energy leading to high energy costs and inefficient costs of production and post harvest processes

Low affordability and fragmented markets (ex. inputs, market access, agronomic practices)

## Energy efficient, needs-based PURE solutions can:

- **Improves productivity, affordability and availability of foods**
- **Enable income diversification and increase incomes & savings**
- **Eliminate drudgery and improve livelihoods**
- **Enhances food safety, freshness, nutrient preservation**

1. On-the-Ground Research
2. Technology Testing & Field Demos
3. Finance & Business Case Development
4. Training & Capacity Building
5. Stakeholder Networks & Engagement
6. Funding Models

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

**SNV with partners 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 pinpointing systemic constraints and practical opportunities.**

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

**ON THE GROUND RESEARCH** - EXAMPLE

# SEFFA programme[1] 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 |

[1] SEFFA (Sustainable Energy for Smallholder Farmers) is a project initiated by EnDev (Energising Development) and co-financed by the IKEA Foundation. It aims to improve the livelihoods of smallholder farmers in Ethiopia, Kenya, and Uganda by increasing access to renewable energy technologies for agricultural, dairy, and horticultural, productive use. Running from 2021 to 2024, the project was implemented by GIZ, SNV and RVO.

**ON THE GROUND RESEARCH** - EXAMPLE

# SNV's conducted an in-depth assessment for dairy processing and off-grid technologies for poultry farmers in Ethiopia via SEDP [2] project

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

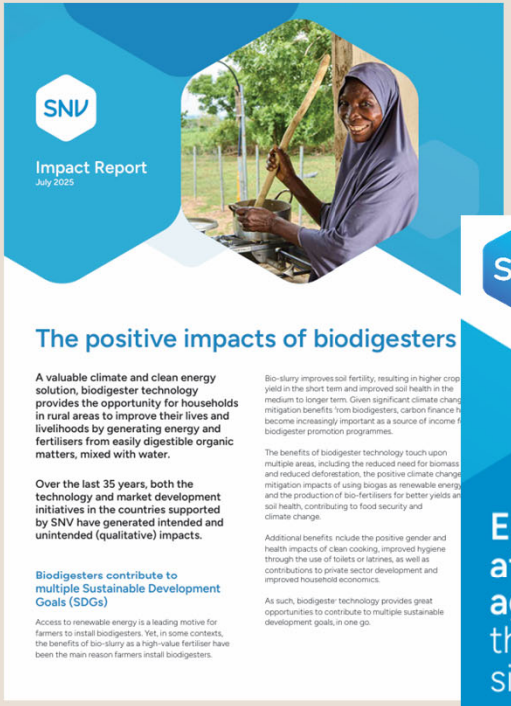
There is poor regional presence outside Addis as **machine suppliers perceive low demand and solar suppliers feel funding constraints.**

## Financial linkages

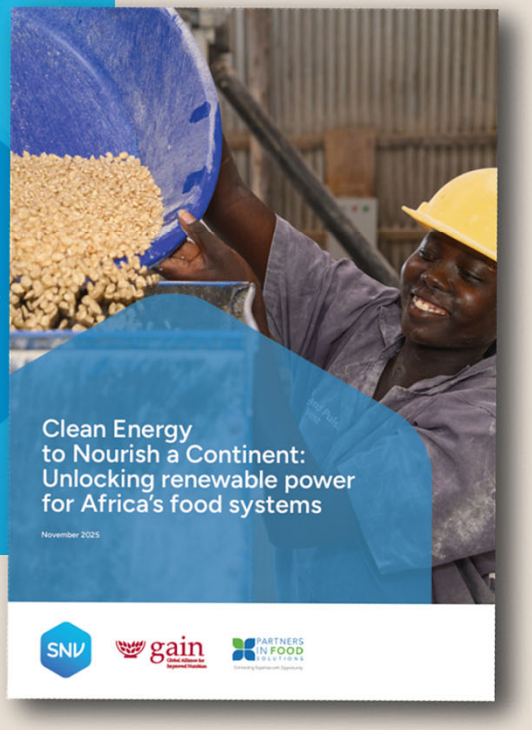
**There is poor access to foreign currency** needed to ensure a stable supply of mostly imported and expensive to obtain technologies.

[2] SEDP (Sustainable Energy for Productive Use in Dairy and Poultry Value Chains in Ethiopia) was implemented by SNV as a 2-year micro-pilot project in partnership with technical advisory support of Global SDG7 Hubs, a SELCO Foundation initiative. IKEA Foundation supported smallholder dairy and poultry farmers in Ethiopia improve their livelihoods through the productive use of renewable energy (PURE) technologies. It piloted three PURE technologies -solar-powered poultry houses, cream separators, butter churners

**PUE Publication** - EXAMPLES




Recent publications produced with partners

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

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

**Prioritise testing of solutions not otherwise demonstrated in the region.**

**Conduct assessments, market research, deploy solutions and capture data for future innovations.**

TECHNOLOGY TESTING & FIELD DEMOS

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

**TECHNOLOGY TESTING & FIELD DEMOS** - EXAMPLE

# In partnership with Ntakye Holdings in Uganda, SNV tested 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:**

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

**6**

**Demonstration sites for solar milking machines in Uganda.**

**Ntakye is now innovating using 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 under IMEU I [3], 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 inflated their operational expenses and squeezed profit margins with **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

[3] IMEU (Inclusive Markets for Energy Efficiency in Uganda) The Inclusive Markets for Energy Efficiency in Uganda (IMEU) is a four-year project funded by the Embassy of Sweden. The project is implemented by a consortium led by SNV with support from Makerere University College of Engineering, Design, Art and Technology (CEDAT) and Private Sector Foundation Uganda (PSFU) as implementing partners. IMEU's overall objective is to develop sustainable, inclusive markets for appropriate energy efficient (EE) products and services for households, businesses, and institutions in agriculture and the built environment to enhance livelihoods and increase the resilience and competitiveness of businesses in Uganda.

**TECHNOLOGY TESTING & FIELD DEMOS** - EXAMPLE

# SNV and partners have been working to develop the biodigester market in various countries.

## In Zambia, the focus is on the climate resilience of SHFs, with biogas as clean, renewable energy and bio-slurry as a 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 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 **negotiate 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.

**We develop innovative business cases and financing models for PURE-Agri technologies along with our key partners.**

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.**

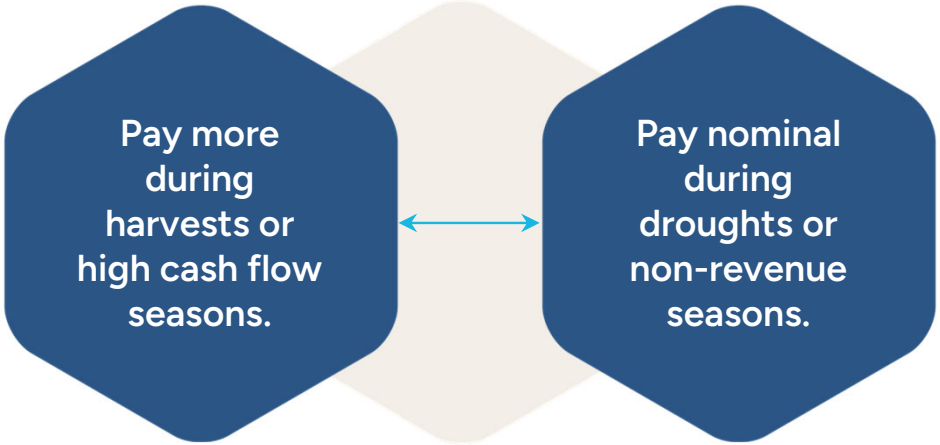
**FINANCE & BUSINESS CASE DEVELOPMENT** - EXAMPLE

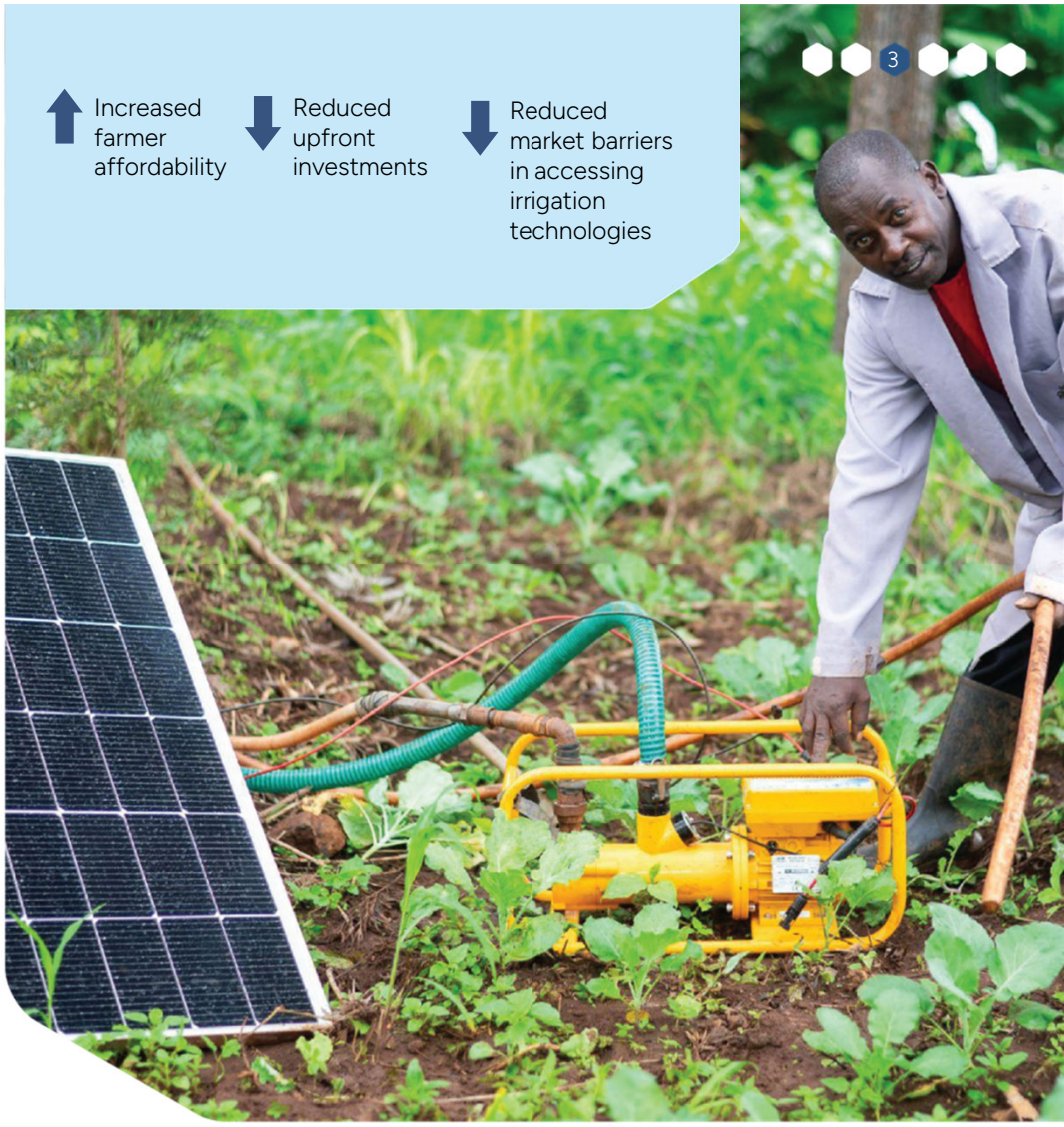
# A local Kenyan distributor piloted a Pay-As-You-Go (PAYG) business model tailored to farmers' seasonal cash flows.

**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.



**FINANCE & BUSINESS CASE DEVELOPMENT** - EXAMPLE

# 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 address high upfront investment costs and increase end users' last-mile 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 a monthly service fee, depending on 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 a 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.**

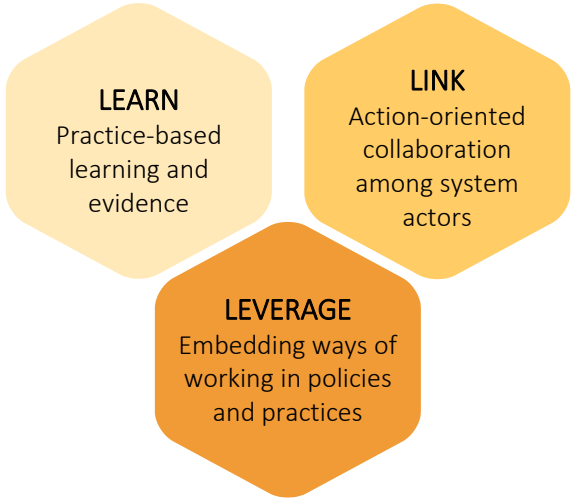
FINANCE & BUSINESS CASE DEVELOPMENT - EXAMPLE

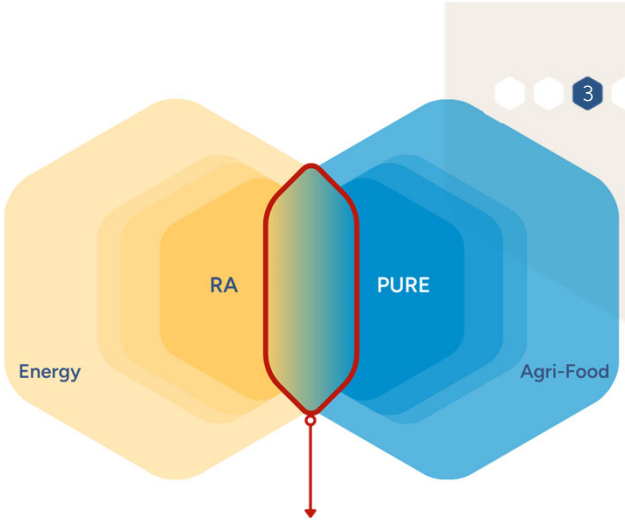
# The Power for Food Partnership[4] brings together regenerative agriculture and renewable energy to transform agri-food systems—restoring ecosystems, reducing emissions, and improving farmers' efficiency and resilience.

Moving beyond project thinking, moving towards systems transformation:

- Co-creating with partners, linking programmes
- Locally led development through coordinated local action
- Creating nexus models for replication and scale
- Leveraging multi-sector expertise and networks

Via three pathways:




## Building the RA-PURE nexus to a systems level

| | | | |
|---|---|---|---|
| **Food chain** | **Inputs, Production, Harvest** | **Aggregation, Transport, Processing** | **Distribution, Consumption** |
| **Building an ecosystem of products & services** | De-weeders, sprayers, transplanters, pest repellers, solar fencing, hydroponics, soil testing, irrigation, milking machines, biodigesters, poultry brooding | Refrigerated transport, cold storage, processing machinery (mills, dryers, peelers etc), sealing & packaging machines | E-mobility, packaging solutions, retail cold storage |
| | Finance<br>Evidence<br>Tech: RnD & supply chains<br>Skill development<br>Value chain development<br>Market access<br>Cross sector TA<br>Demand activation<br>Inclusive models & practices<br>Business case development<br>Policy | | |

[4] Power for Food Partnership is a multi-country partnership in Uganda, Rwanda, Kenya, and Ethiopia, with an initial five-year phase supported by €45 million in funding. Its mission is to catalyse partnerships and strengthen capacities to transform the agri-food system in Eastern Africa by enabling ecosystem actors – in particular, smallholder farmers and small and medium-sized enterprises – to adopt regenerative practices powered by renewable energy.

## SNV prioritises training & 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 sub-sectors.**

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

**TRAINING & CAPACITY BUILDING** - EXAMPLE

# 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** 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, and 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

# Builds awareness of PURE-Agri solutions and strengthens the capacities of ecosystem actors.

**SNV, with local partners, delivered training 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

# Provided training to end-users in Ethiopia on energy system maintenance and agri-business best practices.

**Scale and geographic barriers prevented PURE technology distributors from training end users on the 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:

### Solar system training

**System maintenance and troubleshooting** training from the solar system installer.

### PURE training

Training on operation of PURE-Agri technologies

### Business training

Guidance on **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.**

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

## In collaboration with the Ministry of Energy & Mineral Development and other partners, SNV 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.**

**5**

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

5

Stakeholders include:

**Public institutions**
**Financing companies**
**Private sector**
**Energy and agricultural farmers**

**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**, the local primary supplier of day-old chicks 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.**

**STAKEHOLDER NETWORKS & ENGAGEMENTS** - EXAMPLE

# Co-establishment of a global Agri-Energy Coalition with core partners

To catalyse transformative systems change and accelerate the adoption of renewable energy solutions in food systems. This will be achieved by facilitating new forms of collaboration, collective action, and empowering members with the capacities needed to drive positive change.

## Coalition development


The Agri-Energy Coalition is a global alliance of partners (30+ members) working on energy, water, agriculture, nutrition, climate and finance created to unlock the potential of agri-food systems with clean energy.

**Key outcomes for the coalition:**

- **Nexus approach incorporated in programme design**
- **Policies and standards aligned to make ag-energy systems easier to deploy**
- **Expansion of private sector investment into inclusive portfolios**
- **Viable and scalable ag-energy business models**



Steering committee (core partners): **Energy Saving Trust, GAIN, GIZ, GOGLA, IRENA, REEEP, SNV and Wageningen University & Research**

## To enable scale, SNV along with key partners 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.

**FUNDING MODELS** - EXAMPLE

# Designed a challenge fund to stimulate innovative ways of improving access to PURE-Agri technologies.

**In one case, SNV partnered with Purpose Black 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 demonstrate the feasibility of hydroponics to support its 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

# 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, fostering innovation, and learning.**

This model has helped successfully pilot PURE solutions across countries and 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.**

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

SunCulture is a 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 three 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 and 2024

Enhanced productivity, reduced costs and higher affordability for SHFs

Demonstration to other community members

A total amount of €144,131 was awarded through RBF.

# Utilising RBFs in Ethiopia to incentivise 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.**

# Key partners
















IKEA Foundation



MAKERERE UNIVERSITY




Netherlands Enterprise Agency





Global Energy Alliance
for People and Planet

AGRI-ENERGY
COALITION
Clean Energy. Resilient Food Systems. Healthier Futures.

Alliance Ginneries Ltd

awelo
millers



Parkstraat 83
2514 JG, The Hague,
The Netherlands
+31 70 3440 244

To learn more about our work in the PURE Agriculture space, reach out to:

**Sarah Alexander**
**Global Technical Advisor, Energy**
**Email : salexander@snv.org**