SDG 7 FOR

CHAMPION FARMERS

Empowering Farmers with Decentralized Renewable Energy for Post Harvest Processing and Value Addition

SELCO FOUNDATION

SDG 7 FOR SDG 8

SUSTAINABLE ENERGY AND LIVELIHOODS NEXUS

PREFACE

Farmers possess the remarkable opportunity to amplify their income twofold by embracing on-farm processing and value addition. Energy plays a critical role in making this happen; hence, for resilient farm activities, decentralized renewable energy sources are harnessed to run the machinery. This document is an effort to create a repository of farmers who have emerged resilient against all odds showcasing sustainable and resilient ecosystems in agriculture and allied sectors. These farmers are champions who offer valuable insights into the seamless integration of technology and decentralized sustainable energy to make their businesses economically and socially viable.

Central to our endeavors is an exploration into the viewpoints of exemplary farmers. These individuals offer insights into best practices adopted by a farmer to enhance livelihood opportunities at the farm level. It stresses the growing need for post-harvest processing aspects, i.e., whatever is grown on the farm, is procured (collectives) and processed into finished (end) products through machinery and decentralized renewable energy. The importance of these case studies lies in their ability to inspire and encourage a greater number of farmers to adopt best practices through decentralized renewable energy interventions. Moreover, they underscore the synergy between diverse sectors, such as Animal Husbandry and Agriculture and Resilient Micro Business and Agriculture.

Our overarching strategy entails crafting distinct models with the potential for seamless replication across various districts, states, and even nations. Additionally, it also involves unlocking different schemes and policies of Central and State like PMFME, MUDRA, AIF and other linkages leveraging the support from different sources, making it affordable for common and collective farmer.

Table of **Contents**

Sustainable Energy for Agriculture and Allied

Access to energy in a sustainable manner is among the most crucial poverty alleviation tools. It underpins all other development goals.

Decentralized energy access models offer ways to democratize access to basic amenities at the doorstep of people experiencing poverty. It allows for uptake of basic services through modes of delivery such as mobile healthcare delivery, enhanced education aids via digitization, agriculture processing for smallholder farmers, etc.

Decentralized energy enables creation of assets and resilient pathways for the poor via encouraging uptake of livelihood solutions and skilling, spurring local entrepreneurship innovations, which leads to increased ownership at the last mile and a shift of the poor being merely labor force to decision makers or co-developers in supply chains. By integrating decentralized energy in Healthcare, Education, Agri and Allied activities, Resilient Micro Businesses and Built Environment, it creates safety nets for the poor to be able to grow.

SELCO Foundation seeks to inspire and implement socially, financially and environmentally inclusive solutions by improving access to sustainable energy.

01 North Karnataka regions have some of the most **arid and driest** regions.

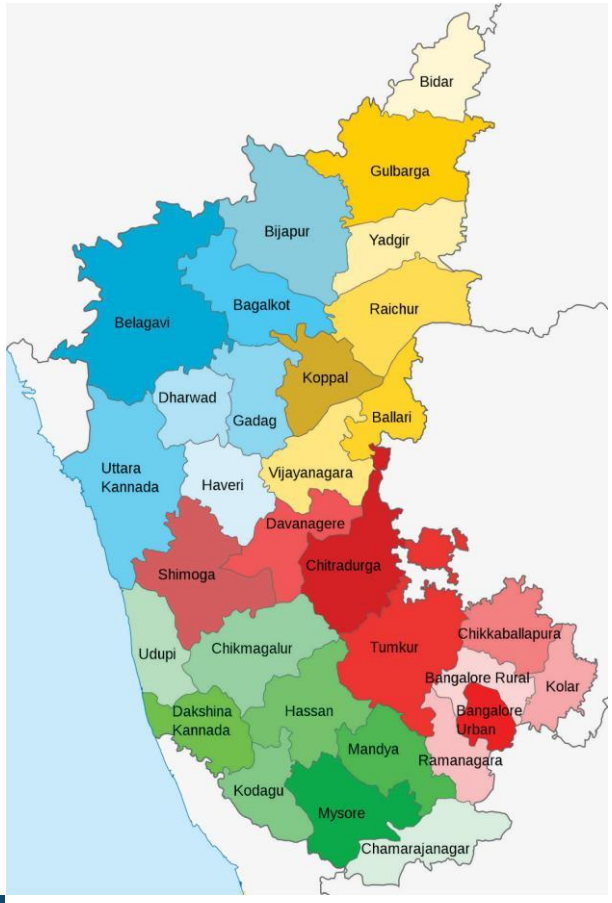
02 Only 33% of overall Kharif cultivation was done in 2023 in Karnataka.

03 11 lakh hectares across NK regions faced losses because of lack of irrigation due to reduced rainfall in 2022.

04 The changing climate results in **permanent migration** from less densely settled areas to high dense areas.

05 **18** forest grids of the western ghats region are projected to undergo major changes by the 2030s.

North Karnataka Climate Lens



Source: https://www.vijaykarnatakaepaper.com/

Why is inclusive and sustainable energy critical for Farmers?

Innovations in the agricultural sector does not consider the needs of small and marginal farmers with limited access to capital, who have to diversify to be viable and cannot take on increased energy burdens. With most farmers lacking access to machinery, increased access to inefficient machinery would result in increased

The solutions demonstrated by SELCO Foundation under this portfolio focus **on post-harvest processing and value addition at farm level realizing the need and importance of Decentralized small-scale processing using clean energy as a catalyst for livelihood enhancement and promote local production and consumption.**

SELCO Foundation works with core Agriculture stakeholders to develop Sustainable Energy driven Solutions across the Value Chain. Our focus is **to improve prosperity and resilience of small and marginal farmers.**

Fortune in Integrated Farming

> “Ramesh has secured several state and national awards for being a champion farmer. ‘Krushi Pandith’ FY 2022-2023.”

Shri Ramesh Khangoudar

Kalloli, Belagavi **| Grows:** turmeric, sugarcane, soya and Horticulture crop **| Livestock:** 10 cattle, 20 hens, 5 ducks, 5 rabbits, 20 pigeons, 200 fishes, 2 boxes of honeybees and 2 turkeys **| SELCO Intervention:** Solar powered hydrophonics, oil extraction unit, pulveriser and chilli pounding unit **| Partner:** Krishi Vigyan Kendra

Problem Statement: Ramesh is involved in agriculture and allied activities,he sought post-harvest processing business opportunities but was cynical due to frequent power cuts at his village throughout the year.

Mr Ramesh Khangoudar is a champion farmer from Kalloli village of Belagavi district. He has adopted integrated farming techniques in irrigating 10 acres of farmland. Ramesh and his brother Mallikarjun are involved in agri and allied activities. He uses cattle dung to generate on-farm organic fertilizer via an anaerobic digestion technique. He makes organic gomutra ark of cow urine and organic dupa of cow dung. He processes sugarcane into jaggery blocks and markets them under his brand name ‘Krushi Sanjeevini Savayava Kendra’. He was introduced to SELCO Foundation during ICICI Foundation X SELCO Foundation hydroponics project collaboration. Ramesh adopted solar-powered hydroponics intervention in 2022. He witnessed hydroponics’ success and wished to adopt DRE machineries for post-harvest processing. **He unlocked the PMFME scheme for solar powered oil extraction unit, flour mill and turmeric pounder with the help of KVG bank.** Post Implementation, Ramesh has set up a trade and service model at his farmland by setting up a petty shop with his brand name where he sells his farm processed goods such as organic turmeric and organic oil pressed groundnut, safflower and coconut oil.

Ramesh has secured several state and national awards for being a champion farmer. He has secured the **‘Krushi Pandith’ FY 2022-2023** award from the Department of Agriculture. He is a resource person for KVK and the Department of Agriculture. Agriculture University students visit his farm for exposure.

Program Intervention

Proposed Solution - To enable renewable energy as a resource in post-harvest processing, Solar-powered hydroponics, oil extraction unit, flour mill and pulverizer was proposed to the farmer. Training on the utilization of machineries was provided post-implementation. PMFME scheme was unlocked with the help of KVG bank.

IMPACT

- The farmer has set up a petty shop next to the highway under his brand name, where he markets farm-processed produce.
- He provides flour mill and oil extraction services to the surrounding 5 villages.
- He is a resource person for KVK and the Department of Agriculture and promotes DRE at various conferences and workshops.

Farmer's Best Practices

Organic Farming uses local organic seeds and organic fertilizers from anaerobic digestion. The farmer makes organic fodder for domestic animals.

The farmer is involved in organic post-harvest processing.

Provides DRE training to other farmers and Agriculture graduates.

Ecosystem Mapping

Capacity Building	Financial Institute	Technology	Market Linkage
Krishi Vigyan Kendra – Tunkanatti and Selco Foundation	Karnataka Vikas Grameena Bank (PMFME Scheme)	Bluetech International, Blue Star Technology, Auto Studio and SELCO India	Entrepreneur Driven

Empowered Woman Runs a Successful DRE Driven Business

Smt. Radha Hegde

Ummachagi, Sirsi | **Grows:** arecanut, banana, turmeric and coconut | **Livestock:** 5 Cattle |SELCO

Intervention: Solar powered oil extraction unit, flour mill and pulveriser | **Partner:** Bharatiya Vikas Trust

> **"During the pandemic, Radha's flour mill and pulveriser helped her village and the surrounding village to access flour milling and spice-pounding facility in the village vicinity."**

Problem Statement: People in and around Radha's village did not have access to oil milling facility and hence consumed adulterated oil or refined oil. Radha sought this travail as a business opportunity and a means to support her community access organic cold pressed oil for consumption purposes.

Mrs. Radha, an organic farmer from Ummachagi village in Uttara Kannada district, also a former taluk panchayat member, dedicates herself to women's welfare. On her 4-acre land, she cultivates bananas, arecanut, and turmeric, employing 4 labourers and yielding 15 quintals of arecanut per cycle. She is a member of 'Ambika Mahila SHG,' which processed bananas and jackfruit into chips and sold them to local bakeries and eateries. However, due to the COVID-19 impact, the group had to stop its activities. Radha was introduced to SELCO Foundation through Bharatiya Vikas Trust when she was a taluk panchayat member; she actively participated in SELCO Foundation X Bharatiya Vikas Trust's DEP project for education.

In 2019, Radha expanded her business, adding a flour mill and pulveriser to her farmland, providing accessible DRE livelihood facilities to her village and nearby villagers. During the pandemic, her flour mill and pulveriser helped her village and the surrounding village to access flour milling and spice-pounding facility in the village vicinity. The presence of the service in their village is recognized as a big boon. Post-COVID-19 economic recovery, Radha approached SELCO Foundation again for the value addition of an organic oil extraction unit to promote the indigenous process of oil extraction through the DRE approach. Post implementation, people from also access DRE-driven facilities.

Program Intervention

Proposed Solution - To enable renewable energy as a resource in post-harvest processing, A solar-powered 2 HP oil extractor, flour mill and pulverized were proposed to the farmer. Training on the utilisation of machineries was provided post-implementation. A loan of INR 1,00,000 was extracted from VSS to adopt the DRE solution (oil extraction unit).

IMPACT

- Villagers appreciated the presence of such a facility- since the travel restrictions were announced due to COVID-19, the presence of the service in their village is recognised as a big boon.
- Radha provided employment opportunities to 4 laborers in her village which helps in reducing local unemployment rates and contributed to the economic well-being of the community.

Farmer's Best Practices

The farmer practices vermicomposting for organic fertilizer and collects organic seeds from local farmers, building a micro-ecosystem.

Radha uses a mixed cropping method for crop cultivation. Mixed cropping gives additional protection to the primary culture from severe weather conditions.

Ecosystem Mapping

Capacity Building	Financial Institute	Technology	Market Linkage
Bharatiya Vikas Trust and SELCO Foundation	Vyavasaya Seva Sahakari Sangha Niyamita	Kovai Nature Tech, Star Association and SELCO India	Entrepreneur Driven

Farm Grown and Farm Made

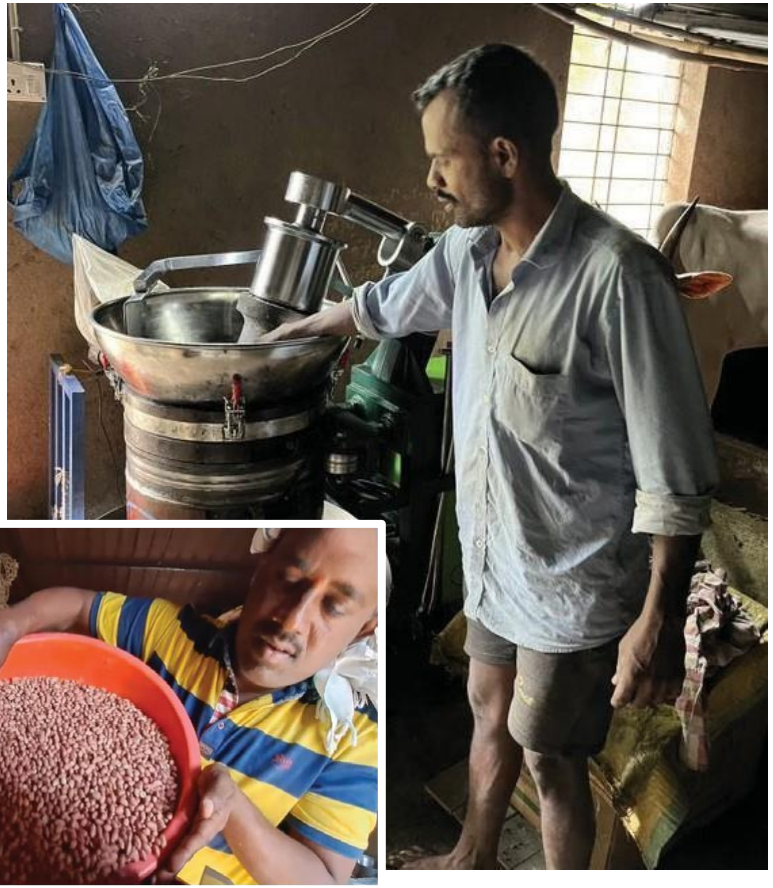
Shri Fakkirgouda Patil and Shri Basangouda Patil

Ummachagi, Sirsi | **Grows:** arecanut, banana, turmeric and coconut | **Livestock:** 6 Cattle |SELCO

Intervention: Solar powered oil extraction unit, flour mill and pulveriser | **Partner:** Savayava Sante

> **The brothers actively participate in Bailhongal Savayava Sante, an organic marketing platform at Bailhongal that conducts a weekly fare from Friday to Sunday to sell their farm grown produce fresh.**

Problem Statement: Fakirgouda and Basangouda are organic farmers who are involved in organic marketing at Bailhongal, they sought the market opportunity for cold pressed organic oils, but lacked frequency in power supply to set up a PHP unit as they reside in their farmland in the outskirts of their Lakkundi Village.



Mr Fakirgouda Patil and Basangouda Patil are champion farmers from Lakkundi of Belagavi district. The brothers practice organic farming on their 5 acres of land with a borewell and krushi honda for irrigation. They cultivate garlic, green leafy vegetables, horticulture crops and have marked their land boundary with coconut cultivation. They are involved in allied activities such as dairy farming, ghee processing, and curd by rearing 3 cattle. They collect seeds from a local organic source and practice vermicomposting for organic fertilizer. The brothers actively participate in Bailhongal Savayava Sante, an organic marketing platform at Bailhongal that conducts a weekly fare from Friday to Sunday for farm fresh organic produce to sell organic jaggery processed from their farm-grown sugarcane. Fakirgouda was introduced to SELCO Foundation through solar-powered cold storage at Savayava Sante installed by SELCO Foundation `in 2022. Their site was visited for need assessment when they registered their interest in owning a solar-powered post-harvest processing unit for trade and service business models, as their village lacks reliable grid electrification. Based on the need assessment, they were advised to adopt solar-powered oil extraction unit technology as their village and surrounding 5 villages did not have access to oil milling; hence, the villagers were forced to consume unadulterated oil or travel 16 km for the organic oil processing unit. Post Implementation, the brothers have adopted trade and service models; they provide services to the surrounding 5 villages and process 15-20 litres of cold-pressed organic oil for trade at savayava sante every week.

Program Intervention

Proposed Solution - To enable renewable energy as a resource in post - harvest processing, A solar powered oil extraction unit was proposed to the farmer. Training on utilization of machineries was provided post implementation. A loan of INR 1,60,000 was extracted from Vijaya Bank for this project.

IMPACT

- Villagers from Negur, Yargundi, J K Koppa, Murkibari and Lakkundi access the oil milling services provided by Fakirgouda and Basangouda.
- Villagers are able to access consumable organic cold pressed oil in viable vicinity making the process more accessible and reducing transportation costs.

Farmer's Best Practices

The farmer uses mixed cropping method for crop cultivation Mixed cropping gives additional protection to the primary culture from severe weather conditions.

The farmer practices farm pond technique to irrigate his farmland. He uses vermicompost technique to generate organic fertilizer.

Ecosystem Mapping

Capacity Building	Financial Institute	Technology:	Market Linkage
Savayava Sante - Bailhongal and SELCO Foundation	Vijaya Bank	Blue Tech International and SELCO India	Entrepreneur Driven

> **Bibijan's self-help group millet processing plant has established, improved, and saved livelihoods in her village and neighboring regions. The Bibi Fathima Swasahaya Sangha millet processing unit processes 30 quintals of Brown top, Foxtail, Little and Proso millet weekly. Their products are shipped to consumer bases in Maharashtra, Tamil Nadu, Telangana, Andhra Pradesh, Odisha and Karnataka.**

Millet Woman of Karnataka

Smt. Bibi Jan

Thirtha, Dharwad | **Grows:** Millets, Pulses, Groundnut, Coconut and Papaya | **Livestock:** 2 goat and 4 cows | **SELCO Intervention:** Solarpowered millet processing unit | **Partner:** Sahaja Samrudha & IIMR

Problem Statement: Bibi Fathima Swasahaya face a lot of issue to electrify their millet processing unit and also since the unit is located in a remote village, the villagers sometimes face power cuts for 2 days.

Mrs. Bibi Jan is an accomplished organic farmer from Thirtha village in Dharwad district. With a sprawling 3-acre farmland at her disposal, she and her dedicated family cultivate nourishing crops such as little millet, Kodo millet, various pulses, groundnut, coconut, and papaya. She is the convenor of the Bibi Fatima SHG and the CEO of Devadhanya FPO. She has steadfastly brought people along for the ride, which includes over 1,000 farmers. Her self-help group's millet processing plant has established, improved, and saved livelihoods in the village and neighbouring regions. The SHG has established a community millet processing centre with six machines given as innovation grant by IIMR and Sahaja Samrudha. She along with her SHG have created a community seed bank, which houses over 120 kinds on the verge of extinction. Bibi Jan faced a major problem in electrifying the 25 HP millet processing unit as it is located in a remote village. Sahaja Samrudha (NGO Partner) helped Bibi Jan connect with the SELCO Foundation for the solarisation of the millet processing unit. The Bibi Fathima Swasahaya Sangha millet processing unit processes 30 quintals of Browntop, Foxtail, Little and Proso millet weekly. About 80% of this sold due to the market access and location. The group is involved in the post-harvest processing of millet into flattened rice, semolina, flour and horse gram+millet health drink, which are branded under their FPO' Devadhanya FPO'. Their products are shipped to consumer bases in Maharashtra, Tamil Nadu, Telangana, Andhra Pradesh,Odisha and Karnataka. Bibi Fatima SHG has empowered hundreds of women by providing them the training and resources to be self-employed and self-reliant. The group has been awarded several state and national awards.

Their future focus includes increasing local consumption, guiding women in processing principles, operating machines, and promoting bran's nutritional value to younger community members.

Program Intervention

Proposed Solution - To enable renewable energy as a resource in post-harvest processing, A 4.5 HP millet processing unit was proposed to the farmer. Training on utilization of machineries was provided post implementation. INR 80,000 was contributed by SHG towards solarisation of Millet Processing Unit

IMPACT

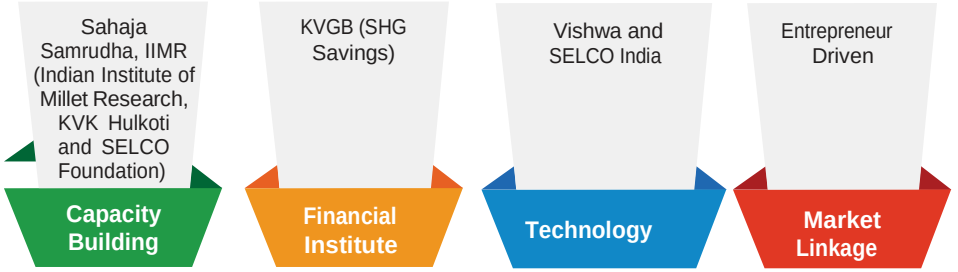
- The community seed bank with over 120 endangered seed varieties plays a critical role in conserving and preserving biodiversity. This ensures the availability of diverse crops for future generations.
- Pre - intervention, the electricity bill paid by the SHG was INR 8000, which is now reduced to INR 3000.
- The creation of branded products such as flattened rice, semolina, flour, and health drinks using millets has expanded their product range. This allows for value addition to the millets and enhances marketability.
- The SHG focuses on guiding women in processing principles and operating machines imparts valuable skills.

Farmer's Best Practices

The farmer uses mixed cropping methods for crop cultivation. Mixed cropping gives additional protection to the primary culture from severe weather conditions.

The farmer practices the farm pond technique to irrigate her farmland. She uses the vermicompost technique to generate organic fertilizer.

Ecosystem Mapping



Empowered Remote Farmer's Journey

Shri Subray Venkatraman Hegde

Kodsinge, Sirsi | **Grows:** arecanut, banana, pepper and coconut | **SELCO Intervention:** Solar powered oil extraction unit, flour mill and pulveriser

> **As Subray lives in a remote village, there are no flour mills, spice pounders, and oil extraction units in the surrounding 4 villages; therefore, his community travelled 15 km to a nearby town to access these facilities.**

Problem Statement: As Subray lives in a remote village, there are no flour mills, spice pounders, and oil extraction units in the surrounding 4 villages; therefore, his community travelled 15 km to a nearby town to access these facilities.

For 50 years, Mr. Subray Venkatraman Hegde, an organic farmer from Kodsinge village, Uttar Kannada district, has lived with his family of 4 in a remote area devoid of essential amenities such as transportation, reliable grid connectivity, and livelihood facilities. Subray efficiently intercrops arecanut, banana, pepper, and coconut on his 1.5-acre land with a farm pond. He sources organic seeds and fertilizers locally, yielding 10 quintals of arecanut and 3 quintals of pepper per cycle.

As Subray lives in a remote village, there are no flour mills, spice pounders, and oil extraction units in the surrounding 4 villages; therefore, his community travelled 15 km to a nearby town to access these facilities. Hence, Subray planned to expand his business by implementing an oil extraction unit, pulverizer and flour mill unit to help his community and generate extra revenue.

Subray was introduced to SELCO Foundation by SELCO Solar Pvt. LTD Sirsi branch. Post implementation, Subray and his family indulge in post-harvest processing of coconut and groundnut into

organic cold-pressed oil, wheat and rice into flour and pepper and soap pod into powder. He has adopted a trade and service model for his business. Surrounding 4 villages and remote communities access this service.

Program Intervention

Proposed Solution - To enable renewable energy as a resource in post-harvest processing, A solar-powered 2 HP oil extractor, flour mill and pulveriser were proposed to the farmer. Training on the utilization of machineries was provided post-implementation. A loan of INR 3,00,000 was extracted from The Kanara DCC Bank Ltd to adopt the DRE solution.

IMPACT

- The farmer now has a diversified income stream, insulating him against financial shock.
- Surrounding villages are appreciative of the presence of livelihood facilities in viable vicinity.
- The villagers have access to unadulterated organic oil for consumption.

Farmer's Best Practices

The farmer practices the farm pond technique to irrigate his farmland. He uses the vermicompost technique to generate organic fertilizer.

The farmer uses mixed cropping methods for crop cultivation. Mixed cropping gives additional protection to the primary culture from severe weather conditions.

Ecosystem Mapping

Capacity Building	Financial Institute	Technology	Market Linkage
SELCO Foundation	The Kanara DCC Bank Ltd	Blue star automotives, Blue Tech International and SELCO India	Entrepreneur Driven

Thriving Organic Farmer

Shri Halappa Shivalinganavar

Itagi, Haveri | **Grows:** Chilli and Pulses | **Livestock:** 4 cows | **SELCO Intervention:** Millet processing unit and oil extraction unit + BE | **Partner:** Vanshree Rural Development Society

> **Halappa processed jowar and ragi seeds to flour and marketed them to vendors at Bangalore, Haveri and Chitradurga.**

Problem Statement: Halappa noticed the need for organic oil extraction unit in his village and surrounding as the villager as the consumers who came to him for millet milling enquired about access to consumable cold pressed oil.

Mr. Halappa Hanamantappa Shivalinganavar is a progressive farmer from Itagi village of Haveri district. He possesses a rainfed farmland of 2 acres where he cultivates garlic, jowar and groundnut. He harvests 5 quintal of garlic and 15 quintal of jowar every crop cycle. Halappa uses locally sourced organic seeds and vermicompost technique for generation of organic fertilizer. Halappa is a BOD of Bhumika FPO (NABARD Sponsored) which is actively involved in input & output activities and post- harvest processing of foxtail and finger millet. The FPO consists of 1000 farmers and 800 shareholders.

Halappa was introduced to SELCO Foundation through a NGO partner Vidivelli Rural Development Society when he was the CEO of Bhumika FPO. Halappa and BODs decided to solarize their millet processing unit by availing kisan loan of INR 15,00,000 in 2018. The FPO processed jowar and ragi seeds to flour and marketed them to vendors at Bangalore, Haveri and Chitradurga. Unfortunately, the FPO faced downfall when NABARD stopped sponsoring them.

Currently, Halappaprocessesmilletsintheprocessingunitaftergainingcompleteownership of the unit. In 2022, SELCO Foundation's built environment team improvised his working condition by redesigning the roof by changing the conventional roof to PPGI sheet with

thermal insulation. Witnessing the success of millet processing unit, in 2023, Halappa opted to have another DRE based income generation source by adopting solar powered oil extraction unit. He is now processing groundnut and coconut organic cold pressed oil for consumption and marketing it across Haveri and Davangere under FPO's brand name and also provides service to local farmers. He also has electrified flour mills and spice pounder and provides services to surrounding 4 villages.

Program Intervention

Proposed Solution - To enable renewable energy as a resource in post-harvest processing, A solar-powered millet processing unit and oil extraction unit was proposed to the farmer. Training on the utilization of machinery was provided post-implementation. Kisan loan of INR 15,00,000 was extracted for Millet Processing Unit and INR 2,00,000 from KVGB for the oil extraction unit.

IMPACT

- DRE adaptation at FPO level educated 1000+ farmers on DRE livelihood intervention.
- The solution has no electrical power expenses, it is durable and has minimal greenhouse gas emissions.
- The farmer is economically self sustainable.

Farmer's Best Practices

- Organic Farming uses local organic seeds and organic fertilizers from anaerobic digestion.
- The Farmer is involved in post-harvest processing for all his farm produce.
- Provides DRE training to other farmers.

Ecosystem Mapping

Capacity Building	Financial Institute	Technology	Market Linkage
Vanshree Rural Development Society (VRDS) and SELCO Foundation	Karnataka Vikas Grameena Bank and NABARD	BlueTech, Vishwa Agro Industry and SELCO India	Entrepreneur Driven

The Spice Prosperous Women Entrepreneur of Dharwad

Smt. Laxmi Kurdi

Bendalgatti, Dharwad | **Grows:** Chilli and Pulses | **SELCO Intervention:** Solar powered flour mill and chilli pounding unit | **Partner:** Shri Kshethra Dharmasthala Rural Development Project

> **Laxmi's husband Arjun is actively involved in Post - Harvest Processing activity and generated a revenue of INR 80,000 in 2023 during the chilli season.**

Problem Statement: Laxmi became the sole bread winner of her family after her husband's accident hence she decided to adopt a DRE based post - harvest processing technology to employ her husband at the comfort of their home and also help villagers access flour mill and chilli pounding facility in their village vicinity.

Mrs. Laxmi Arjun Kurdi is a farmer from Bendalgatti village in the Dharwad district. She lives with her family of 3 and possesses 0.5 acres of farmland where she cultivates chilli and pulses. She harvests 10 quintals of chilli and employs 2 agricultural labourers for harvest activities. Laxmi plays an active role within SKDRDP, serving as a dedicated seva pratinidhi for her village. Additionally, she holds membership in the Sevanti Self-Help Group (SHG). She was introduced to SELCO Foundation through an MBK meeting conducted by SELCO Solar Pvt. LTD. Laxmi adopted sewing machine intervention in 2019 for a diversified income stream, which enabled her to achieve financial stability. Unfortunately, Laxmi's husband Arjun, who was her backbone and helped her look after agriculture activities and worked as a chef at a local hotel, met with an accident which left him with a mobility disability. The family went through an economic crisis as Laxmi became the sole breadwinner of her family. Post-pandemic, after her husband's recovery, Laxmi decided to involve him more actively at home. She achieved this by introducing post - Harvest processing machinery like a chilli-pounding unit and a flour mill. Seeking assistance in implementing these innovative technologies, Laxmi contacted SELCO Foundation for their expertise in distributed renewable energy (DRE). After implementation, her husband Arjun is actively involved in PHP activity and generated a revenue of INR 80,000 in 2023 during the chilli season.

Program Intervention

Proposed Solution - To enable renewable energy as a resource in post-harvest processing, A solar powered flour mill and chilli pounding unit was proposed to the farmer was proposed to the farmer. Training on utilization of machineries was provided post implementation. Loan of INR 1,50,000 was extracted from KVGB to adopt DRE solution.

IMPACT

- The farmer is able to help the village community with a local flour mill and chilli pounder.
- The villagers are able to get their commodity on time as there are no delay due to powercuts.
- She promotes DRE in her village and surrounding area.

Farmer's Best Practices

The farmer uses DRE technology with is reliable and enables her to provide services at a faster pace and on time to her customer base.

Ecosystem Mapping

Capacity Building	Financial Institute	Technology	Market Linkage
Shri Kshethra Dharmasthala Rural Development Project (SKDRDP) and SELCO Foundation	Karnataka Vikas Grameena Bank	Blue Star Automotives SELCO India	Entrepreneur Driven

Agriculture prosperity led to ecosystem development

Shri Gurusiddeshwar Meti

Chikkahesarur, Raichur | **Grows:** Tur dal, pulses, jowar and millet | **SELCO Intervention:** Solar powered oil processing unit and solar power for xerox machine and water filter

> “PHP activities such as dal processing and cold-pressed oil extraction, are carried out by Gurusiddeshwar. He promotes post-harvest processing across Raichur through Amareshwara FPO.”

Problem Statement: Gurusiddeshwar noticed the need for organic oil extraction unit in his village and surrounding as the villagers travelled 55 kms to access the facility.

Mr. Gurusiddeshwar Meti is a progressive farmer from Chikkahesarur of Raichur district. He is a BOD of Amareshwara Farmer Producer Company Limited (SFAC promoted); the FPO is involved in input, output, and post-harvesting activities. It has 1000 registered farmers and 800 shareholders. Mr. Meti possesses a borewell irrigated and rainfed farmland of 15 acres where the farmer cultivates tur dal, pulses, jowar and foxtail millet. Gurusiddeshwar harvests 15-17 quintals of tur dal per crop cycle, which is processed at his dal post-harvest processing unit and marketed by Amareshwara Farmer Producer Company Limited and shipped off to V mart and S mart across Raichur. The farmer also harvests 7-9 quintals of foxtail millet and gets it processed at a unit in Lingasugur. He collects seeds from an organic local source and has a vermicompost source for organic fertilizer. PHP activities such as dal processing and cold-pressed oil extraction, are carried out by Gurusiddeshwar. Additionally, the FPO has provided organic farming training to 300 farmers from Nilugal, Hiresuru and Ondal Hosur villages under the PKVK scheme. The FPO promotes post-harvest processing across Raichur. He was introduced to the SELCO foundation by SELCO Solar Pvt. LTD Raichur branch. The FPO adopted solar systems to power their post-harvest processing units, and Gurusiddeshwar adopted solar powered oil extraction unit. Post Implementation, the farmer processes oil for Raichur and Koppal district farmers. The oil cake is sold to dairy farmers for INR 20 per kg. Gurusiddeshwar is planning a trade model for oil milling and has registered to obtain an FSSAI license. He is planning on planting a solar-powered soil testing unit in Chikkahesarur.

Program Intervention

Proposed Solution - To enable renewable energy as a resource in post-harvest processing, A 2HP oil extraction unit was proposed to the farmer. Training on utilization of machineries was provided post implementation. FPO contributed INR 2,00,000 for the oil extraction unit.

IMPACT

- The Amareshwara FPO has enabled collective marketing and distribution of the agricultural products. The expanded market access helps the farmers receive better prices for their produce and reach consumers across different locations, such as V mart and S mart in Raichur.
- The farmer employs 2 labours to operate his unit.

Farmer's Best Practices

- The farmer uses the vermicompost technique to generate organic fertilizer and uses locally sourced organic seeds.
- The farmer uses mixed cropping methods for crop cultivation. Mixed cropping protects the primary culture from severe weather conditions.
- The farmer is involved in Post Harvest Processing.

Ecosystem Mapping

SELCO Foundation	Self - financed (KVG Bank)	Zentech and SELCO India	Entrepreneur Driven
Capacity Building	Financial Institute	Technology	Market Linkage

Rural Entrepreneurship through Dal Milling

Shri Rajesh Dommeti

Sindhanur, Raichur | **Grows:** Paddy | **SELCO Intervention:** Solar powered dal processing unit

> **Rajesh could not process more than 250 kgs per day due to irregular power supply. Post Solarization, Rajesh can process 500 kg dal per day.**

Problem Statement: Rajesh Dommeti faced challenges with respect to frequent power cuts which slowed down his business therefore he decided to adopt green energy solution.

After 15 years as a Mechanical Engineer at M/S. Voltas. LTD (A TATA Enterprise), Mr. Rajesh Dommeti followed his passion, transitioning from engineering to embracing farming as his true calling in 2020.

He is a progressive farmer who cultivates paddy on his 4.5 acres of canal-irrigated farmland. He harvests 80-85 quintals of rice per crop cycle and uses organic fertilizer generated by vermicomposting technique. Rajesh sought the need for a dal processing mill in Sindhanur as farmers went to distant places to access post-harvest processing for dals such as tur, chana, green gram and urad. Rajesh successfully set up a 5 HP dal processing unit at his residence and built a farmer-customer base in and around Sindhanur taluk. However, eventually, he could not process more than 250 kgs per day due to irregular power supply and voltage fluctuations. Rajesh was seeking alternatives to resolve grid-related issues. Rajesh was introduced to SELCO Foundation by Swastya FPO; he connected with SELCO Foundation and adopted a 10 KVA solar system for his processing mill. Post Solarization, Rajesh can process 500 kg dal per day.

Program Intervention

Proposed Solution - To enable renewable energy as a resource in post-harvest processing, A 10 KVA solar system was proposed to the farmer. Training on the utilization of machineries was provided post-implementation. The farmer contributed INR 50,000 towards the solarisation of his PHP

IMPACT

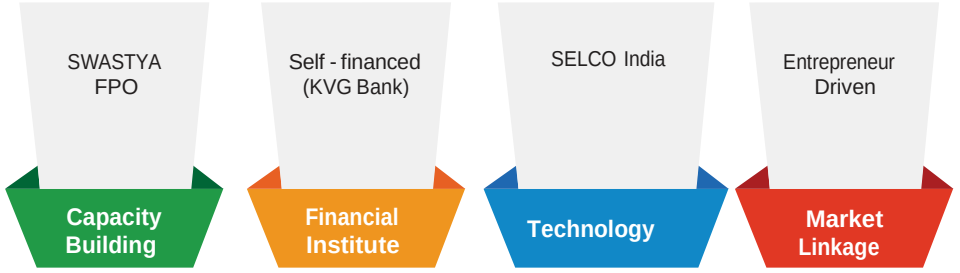
- Rajesh processes 500 kg of dal each day without any disruption whereas preintervention Rajesh processed 250 kg per day.
- Identifying a need for local post-harvest processing facilities for dals, the farmer eliminated the need for farmers to travel to distant places for processing. This reduces transportation costs, time, and resources for the farming community.

Farmer's Best Practices

The farmer uses vermicompost technique to generate organic fertilizer and uses locally sourced organic seeds.

The farmer sought the need in his region for dal processing mill and adapted the technology so he could help the farmers in his region to access post harvest processing facility.

Ecosystem Mapping



Leveraging Natural Resources for Sustainable Farming

Shri Dattatraya Someshwara Hegde

Mavinakoppa, Sirsi | **Grows:** arecanut, banana, coconut, coffee, clove, cardamom, ginger, nutmeg, pepper, turmeric and vanilla |**Livestock:** 10 cattle| **SELCO Intervention:** Solar powered Cold Storage

> **Mr. Hegde spent INR 75,000 every year on cold storage logistics. He has been seeking a solution for this prominent issue for a decade.**

Problem Statement: Unavailability of cold storage nearby caused the farmer to spend INR 75000 to 100000 per crop cycle for transportation of his harvest to cold storage at Byadgi, Haveri for storage.

Mr. Dattatraya Someshwara Hegde is a progressive farmer from Mavinakoppa Village of Uttar Kannada district who practices organic farming for 40 years. He is a graduate in commerce and owns 15 acres of irrigated land where he cultivates arecanut, banana, coconut, coffee, clove, cardamom, ginger, nutmeg, pepper, turmeric and vanilla by adapting intercropping practices which are specific to the Malnad region. He has a small dairy farm with 10 cattle, giving him 20 liters of milk daily. An anaerobic digestion process extracts a good amount of dung to process organic fertilizer. Before selling them off at the local market, he is involved in the post-harvest processing of ginger, pepper, arecanut, nutmeg, and vanilla. He has employed 16 agricultural labourers on his farmland for INR 300 daily.

Dattatraya harvests 10-12 quintals of arecanut and 9-10 quintals of ginger per crop cycle, for which he requires cold storage to store his farm produce until it is sold off at a good price at market. Dattatraya faced logistical issues with respect to the transportation of arecanut and ginger to cold storage at Byadgi, Haveri District. He spent INR 75,000 to 1,00,000 every year on cold storage logistics. He has been seeking a solution for this prominent issue for a decade.

Dattatraya was introduced to SELCO Foundation through SELCO Solar Light Pvt. Ltd. Sirsi branch. The farmer unlocked the PMFME scheme to adopt a solar cold storage solution.

Program Intervention

Proposed Solution - To enable renewable energy as a resource in post-harvest processing, A solar powered 10 MT cold storage was proposed to the farmer. Training on utilization of cold storage was provided post implementation. Dattatraya was able to unlock PMFME scheme with Canara Bank as Financial Institute.

IMPACT

- The farmer saves cold storage logistics of upto INR 75,00,000 to 1,00,000 per year. Now the farmer saves on logistics.
- Mavinakoppa Village has certain limit of power load, stand-alone Solar Power solution is viable for operating small cold storage systems at rural level.

Farmer's Best Practices

- Organic Farming by using local organic seeds and organic fertilizers from anaerobic digestion process.
- Uses biogas and agri waste for post-harvest processing of arecanut.
- Trains local farmers for organic farming practices.

Ecosystem Mapping

Capacity Building	Financial Institute	Technology	Market Linkage
SELCO Foundation	Canara Bank	Ecozen Solutions	Entrepreneur Driven, Crop specific storage (Ginger, Arecanut and Pepper)

A Thriving Journey of Sustainable Agriculture

Dr. Narsana Gouda Veerapur

Dharwad | **Grows:** Mushrooms, orchids and Horticulture Crops | **Livestock:** 5 cattle and 45 hens | **SELCO Intervention:** Solarpowered hydrophonics and cold storage

> **Dr. Veerapur prioritises eco-friendly practices, such as rainwater harvesting, solar harnessing, vermicomposting, and utilising natural, farm-made, and bio-based fertilisers and pesticides.**

Problem Statement: Motivated by Escalating Climate Concerns, Dr. Narsana Gouda Veerrapur Aims to Embrace Green Energy Solutions

Dr. Narsana Gouda Veerapur, a former IT professional with over two decades of experience at Deutsche Bank and HCL Technologies, has transitioned into a thriving champion farmer in Dharwad. Despite his successful engineering career, Dr. Narsana Gouda's journey took a new turn in 2017 when he started farming. In addition to his agricultural pursuits, he actively engages in dairy and poultry enterprises. Dr. Narsana Gouda was introduced to SELCO Foundation by SELCO Solar Pvt. LTD Dharwad branch. He manages 3.5 acres in Kyarkoppa village and 5 more in Dharwad, using innovative techniques for cultivating exotic vegetables, orchids, and mushrooms. He harvests 3 Tons of organic mushroom per crop cycle, which is sun-dried to increase its shelf life and marketed to marts and local markets. The farmer prioritises eco-friendly practices, such as rainwater harvesting, solar harnessing, vermicomposting, and utilising natural, farm-made, and bio-based fertilisers and pesticides. He also provides training to other farmers to adopt these practices. Dr. Narsana Gouda has started an agri-based start-up named 'VKF agri farm' with a vision to uphold the farm-to-fork principles and offers both perishable and non-perishable organic produce. Their goal is to tackle unhealthy food issues, the farmer's share in the consumer's spend, and the environmental impact of modern-day farming. To achieve this goal, they empower marginal farmers by fostering a community and assisting them in growing natural, eco-friendly, and chemical-free food. Narsana Gouda purchases their produce at an agreed-upon fixed price, increasing their share in consumer spending. He was invited to be a Policy Consultant for the Centre for Excellence, Dharwad.

Program Intervention

Proposed Solution - To enable renewable energy as a resource in post-harvest processing A 5MT cold storage and hydroponics was proposed to the farmer. Training on the utilisation of machineries was provided post-implementation. A loan of INR 5,00,000 was extracted from KVG Bank for this project.

IMPACT

- The cold storage is utilised for the storage of organic produce of 25 local farmers, which is marketed at 'savayava sante' organised by Narsana Gowda at his farmland every weekend.
- Solar-powered hydroponics is enhancing the protein and fat percentage of the milk cattle produce.

Farmer's Best Practices

The farmer practices rainwater harvesting techniques to irrigate his farmland.

He uses the vermicompost technique to generate organic fertilizer. His farmland is 100% solarised.

The farmer has adopted farm to fork strategy.

Ecosystem Mapping

Capacity Building	Financial Institute	Technology	Market Linkage
Centre for Excellence for Vegetables and SELCO Foundation	KVG Bank	Ecozen Solutions, Auto-Studio	Entrepreneur Driven

Rural Entrepreneurship through Oilseed Farming

Mr. Kallappa Fakikirappa Naykar

Dharwad | **Grows:** Groundnut, pulses, wheat and jowar | **SELCO Intervention:** Solar powered oil extraction unit | **Partner:** SCOPE NGO

> **Kallappa decided to expand his horizons by adding a post-harvest processing unit at his farmland as their village does don't have access to reliable power source due to which the villagers went to neighboring villages for flour and oil milling.**

Problem Statement: Kallappa noticed the need for solarised organic oil extraction unit and flour mill in his village as the village did not have access to reliable power supply.

Mr. Kallappa Fakikirappa Naykar is a traditional farmer from Hullambi village of Dharwad District. He lives with his family of 8 in his farmland. He possesses 11 acres land with a farm pond and borewell where he cultivates groundnut, pulses, wheat and jowar. He harvests 15 quintal of groundnut and 10 quintal or wheat/jowar every crop cycle and has employed 7 agriculture labours. The farmer utilizes organic fertilizer which is generated in his farm by vermicompost technique. The farmer is a BOD of Krushi Jyothi FPO, which is the FPO of Hullambi village with 1000 farmers registers under it and 750 stakeholders. The FPO is supported by SCOPE NGO which helped Kallappa connect with SELCO Foundation. Krushi Jyothi FPO indulges in input output activities and has recently leased gram panchayat land for post-harvest processing activities. Kallappa actively participated in Krishi Bhagya Scheme awareness programs along with SCOPE NGO by forming a union named 'bennikeri sangha' which helped government to create awareness about farm ponds at rural level.

Kallappa and his sons decided to expand their horizons by adding a post-harvest processing unit at their farmland as their village does don't have access to reliable power source due to which the villagers went to neighboring villages for flour and oil milling. He decided to adopt oil extraction and flour mill technologies as groundnut and jowar/ wheat are their main crops. Kallappa was able to implement DRE driven oil extraction unit and flour mill by unlocking PMFME scheme under State Bank of India with the help of SCOPE NGO and SELCO Foundation. Post Implementation, the farmer is now able to utilize DRE interventions as both trade and service model.

Program Intervention

Proposed Solution - Proposed Solution - To enable renewable energy as a resource in post harvest processing, A solar powered 2 HP oil extractor was proposed to the farmer. Training on utilization of machineries was provided post implementation. Loan of INR 4,50,000 was extracted from State Bank of India to adopt DRE solution.

IMPACT

- The farmer now has multiple sources of revenue that will protect her from the financial turmoil.
- He is able to help his village and surrounding villages access organic oil for consumption.
- The farmer is promoting indigenous process of oil extraction through DRE approach, at a community level.

Farmer's Best Practices

Kallappa has a 'krushi honda' in his farmland to irrigate crops.

Through his FPO, the farmer has created an organic seed bank which is accessed by all FPO members for.

The farmer practices vermicomposting for organic fertilizer.

Ecosystem Mapping

Capacity Building	Financial Institute	Technology	Market Linkage
SCOPE NGO and SELCO Foundation	State Bank of India (PMFME)	Zentech Solution	SCOPE NGO

Conclusion and Way Forward

As most of the agricultural post-harvest processing and value addition happens at a centralized level, the key tool to transform rural livelihoods and farmers livelihood will be decentralization through a cluster approach of farmer as we have witnessed from various case studies mentioned in this document. The document also provides examples for aspiring farmers willing to adapt PHPs to explore business opportunities.

The above case studies depict the need for energy efficient technologies with clean energy as a catalyst to processing and value addition activities. Through this, existing and aspiring farmers can adopt similar crop specific technologies that promote local production and consumption of produce's thereby developing the local economy. On the one hand, farmers involved in processing will fetch better revenue by using raw materials that are available and the communities can utilize the services at viable distance. The farmer' will benefit better prices for their production and increased bargaining power.

Solar Champion' Snippets

Before possessing solar powered cold storage, I paid 75000 for cold storage transportation per crop cycle

– Mr. Dattatraya Degde

SELCO interventions has enabled to use our machineries 24*7 and has given us the confidence to expand our business to new heights

– Mr. Ramesh Khanagoudar

SELCO and its interventions helps rural women to become independent and self reliant

– Mrs. Radha Hegde

SELCO has given me the confidence to expand my business

– Mrs. Savita Patil

SELCO FOUNDATION

SDG 7
FOR SDG 8
SUSTAINABLE ENERGY
AND LIVELIHOODS NEXUS

info@selcofoundation.org | www.selcofoundation.org