

GIZ – SELCO INNOVATION AND REPLICATION



Table of contents

Pg	Chapter
01	Introduction
02	Replication (What be mean by it, potential, types of replication, impacts etc)
04	SELCO's idea of replication
08	Case Study 1 - Integrated Energy Centres
12	Case Study 2 - Solar Powered Sewing Machine
16	Case Study 3 - Revolving Fund
20	Case Study 4 - Service Camps
24	Case Study 5 - DC Refrigerators

June 2015

Authored by SELCO Foundation

Please address comments to surabhi@selcofoundation.org

Introduction

With two decades of grassroots level experience, SELCO has built up a database of innovative processes and solutions-technological, financial and business model-oriented that have the potential to be replicated in other regions and context, with appropriate customization. The goal within SELCO Foundation has been to effectively and efficiently ensure adaptation or replication of solutions suited to specific contexts rather than attempting a 'cookie-cutter' approach to scale up.

Over the last year, with the support of GIZ IGEN-RE and through Incubatees and partners, there has been an effort to identify innovations with high potential for replication and facilitate implementation of the same on the ground. These innovative processes are an important add-on to the current efforts of incubating new energy entrepreneurs, where the focus has largely been on business processes, logistics, sales and technical processes and local ecosystem building.

Replication would further diversify the reach of these new entrepreneurs and partners, thus linking more underserved households, communities with sustainable energy for household needs or productive use. Through initial discussions with incubates and partners, the facilitation and support was better articulated in terms of financing, technological support and operational support. Consequently, interest was expressed in piloting some of the more established innovative approaches in their own varied own geographies.

Innovation, in this context, would be defined as the introduction of a unique product, service, system, process or approach or a combination of more than one, influenced by the specific needs in a certain geography or community that requires alternate approaches for undertaking the technological, financial and/or dissemination aspects of the solution. It is observed that in the process of reaching out to economically poorer communities and deeper in terms of the array of energy services, complexities emerge from the varied local conditions and contexts. To ensure that interventions have impact and sustain themselves, it is important to localize the solutions as well, and this is part of where the innovation itself lies. This booklet is a compilation of some of these innovative approaches and their replications, over time and in different contexts.

What is Replication?

Scaling of solutions is critical, but SELCO Foundation does not define scale as 'super-sizing the organization to spread innovation' (which is convention in the business world). Instead, the foundation is driven by an open source philosophy which believes that effective, efficient and ethical scaling can be achieved through adaptation or replication of solutions suited to specific contexts. It is observed that as one reaches out to the lower rungs of the economic ladder and deeper into an array of energy services, complexities emerge from varied local conditions or contexts. To ensure that interventions impact and sustain it is important to localize the solutions as well.

RF

RF: Bhagini Nivedita

IEC

Shankar's IEC, Udipi, 2012

Services: Home lighting and mobile charging



RF

RF: Basket weavers, migrant community in Karnataka

IEC

Kumar's IEC, Kariammana Agrahara, 2013

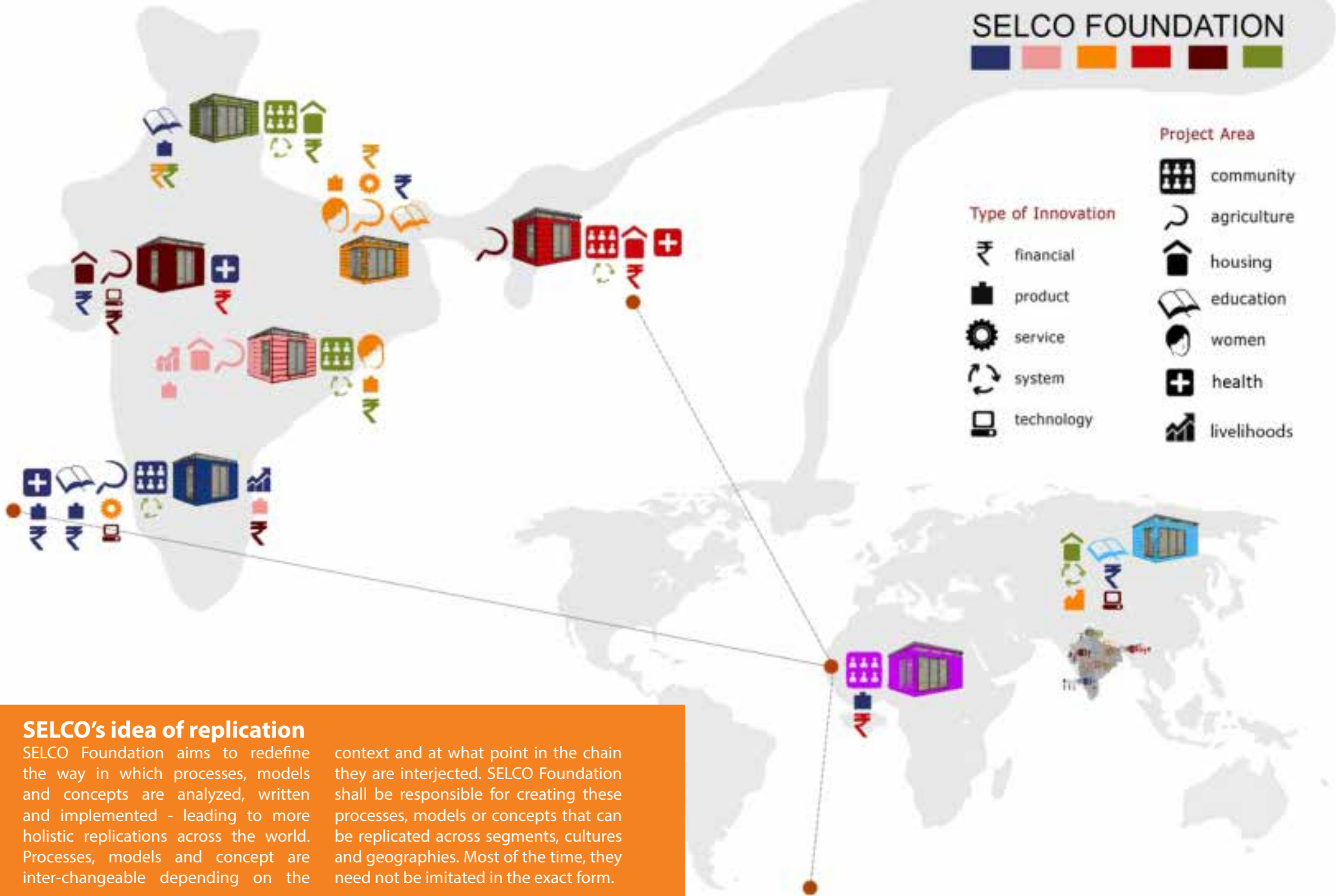
Services: Home lighting, mobile charging, solar fridge, projector



1 IEC, 2014 and 4 VLCs 2015, Kalahandi, Services: Printing, photography, photocopying, CD/DVDs, internet ticket booking, home lighting, mobile charging

Can the IEC be replicated in Africa?

SELCO FOUNDATION

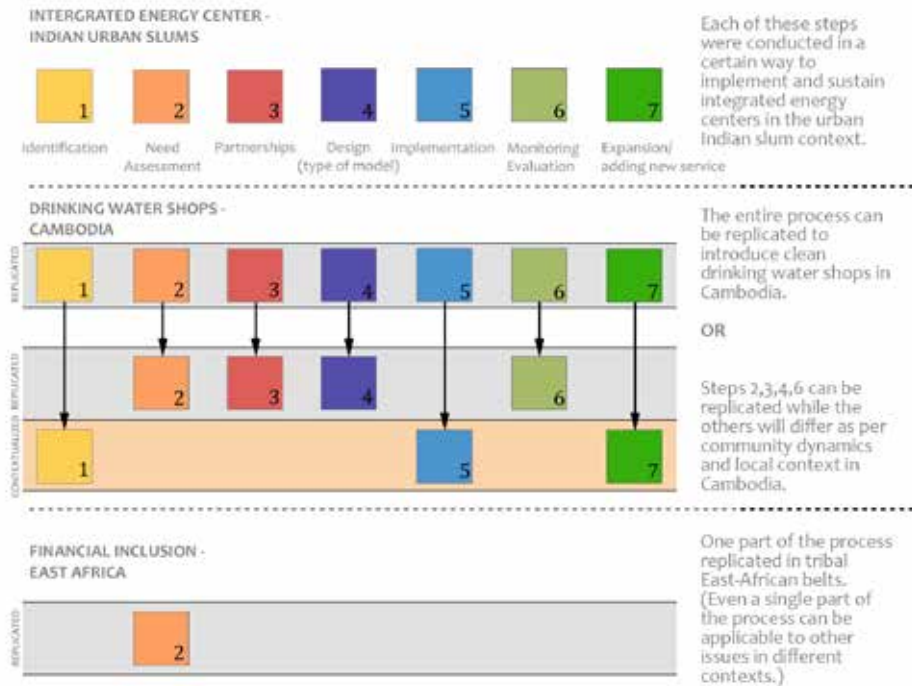


SELCO's idea of replication

SELCO Foundation aims to redefine the way in which processes, models and concepts are analyzed, written and implemented - leading to more holistic replications across the world. Processes, models and concept are inter-changeable depending on the

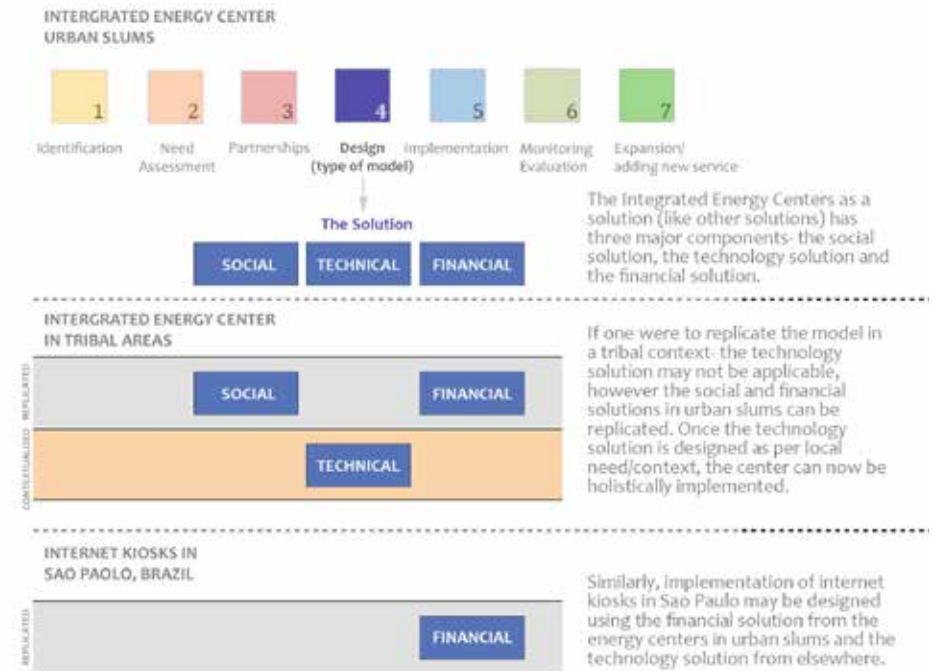
context and at what point in the chain they are interjected. SELCO Foundation shall be responsible for creating these processes, models or concepts that can be replicated across segments, cultures and geographies. Most of the time, they need not be imitated in the exact form.

Process replication



For example, a process might have seven steps. Out of the seven steps, 4 or 5 of them are fundamental ones that will have to be followed irrespective of the site or culture, such as need assessment or problem defining steps. Out of the next four, two or three may have to be changed according to the cash flow of the segment or because of local political or market conditions. Even one or two processes can be replicated where applicable.

Concept replication



Using the same example, a similar thought process is applied while replicating a business model or a concept. The variable part of the whole chain will depend on factors like end-usage pattern, fuel availability, human resource skill sets etc. Any one part of the model can also be applicable while implementing other sustainable solutions.

3+ services



ENTREPRENEUR IEC
(RURAL MIGRANT COLONY)
300+ households
have access to the services

5+ services



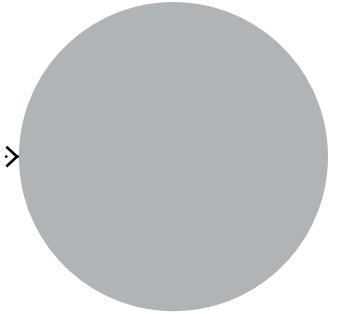
ENTREPRENEUR IEC
(URBAN SLUM)
500+ households
have access to the services

7+ services



ENTREPRENEUR IEC
(TRIBAL CLUSTERS)
1000+ households
have access to the services

New services?

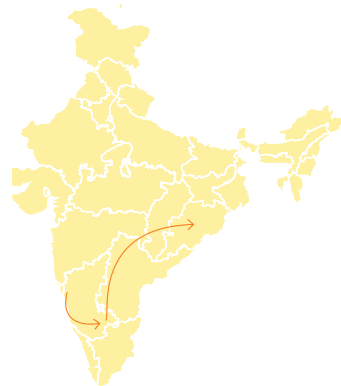


ENTREPRENEUR IEC
(.....?)
X+
types of user segments
(households, businesses,
students etc)?

REPLICATION CASE STUDY 1

INTEGRATED ENERGY CENTERS (IEC)

Integrated Energy Centers (IEC) are sustainable energy powered community centers that can host a range basic services and activities lacking in an under-served community. The centre (IEC) aims at positively impacting quality of life and livelihoods by addressing fundamental energy needs and services relying on energy. This case study captures the replication of the concept, model and parts of the process of designing and implementing a need-based IEC.



Replicated by:

Tribal Community Lab (TCL)

Odisha, Kalahandi



** Case-studies in the Orange column are replicated with GIZ funding*

Tribal Community Lab as part of one of SELCO Foundation's community labs; started with the understanding that tribal communities' needs, access to resources and institutions, livelihood opportunities and challenges in the regions they reside are very different from that of rural or urban poor contexts. Unique barriers like extreme remoteness, exploitation and lack of formal financial transactions make TCL user segments some of the most vulnerable populations in the world.

INTEGRATED ENERGY CENTERS

TRIBAL COMMUNITY LAB (TCL)

Odisha, Kalahandi

Background and Need

Remoteness and lack of access to basic services being the key needs in tribal communities, TCL used energy access and health as an entry point to further analyse what types of services could positively impact the users. Among other critical issues it was evident that people incurred heavy expenditure on getting Xerox copies and passport size pictures clicked for various purposes. The expenditure was mainly incurred

The Replicated Solution

An entrepreneur run centre was set up at a strategic location, this caters to various different energy driven services that people need.

The location was identified, Ratho Duria, a young boy of 22 years. Ratho is a 9th standard graduate and used to work in bank as form filling assistant- where he earned Rs 2 per form he filled. In a day, maximum he could fill 5-10 forms. Lack of opportunities, made Ratho restless, and as survival strategy he migrated to Gujarat and Kerala in search of work. Identifying his entrepreneurial spirit, he

Impacts and Next Steps

Impacts include: livelihood generation for entrepreneur, savings, ease of access for users, entry point into the community for trust building and expanding on more need based services, critical paper work needs met.

transportation from villages to towns. They needed to travel 30km-75km, in some cases, the expenditure cost was as high as Rs 300 (daily wage loss, transportation cost, food cost) to get a 10 rupee Xerox done. Some petty shop keepers had previously tried to keep printers to provide the service but they soon had to shut it down, due to extremely poor power supply.

was identified through community interactions as an IEC champion. Now, Ratho earns Rs 500 - Rs 8,000 per week, with approximately 10 customers a day at his shop for various services and they are able to save their day wage, transportation cost and the harassment tribal community's face in town. Currently, Ratho provides services like print, scan, Xerox, download of music & movie, CD on rent, passport size photograph and WLL phone. He will in the next few months be expanding other services as well.

Next steps include: Expansion of services, developing a local traditional built environment to house such a center and working with panchayats to replicate the model at strategic locations.

Summary

Type of Community- Remote clusters of tribal villages

Type of Center

Inbuilt in existing structure,
Type of Model- Entrepreneur Run

Partner(s)-

Abha Innovations Pvt Ltd (Tech support), TCL-SELCO Foundation (Community Partner)

Families directly benefiting

200+

Current services:

Photocopy
Download
WLL Phone
Video and Photography
Future services:
Renting portable solar home lighting system,
Sound system,
Lamination and
Internet access

Infrastructure Cost-nil

System cost- 110000
Operational cost- varies
Misc/ unexpected costs- nil
TOTAL CENTER COST- 110000

Technical Details

150W panel 100va battery
850va inverter
Financial Details
Entrepreneur earns Rs 3000 on an average per month. Will pay back capital costs through flexible installments in 3 years.



1 ENTREPRENEUR



Kolar, Karnataka;
Retrofitting Energy-efficient
motor, Solar powering

2 ENTREPRENEURS



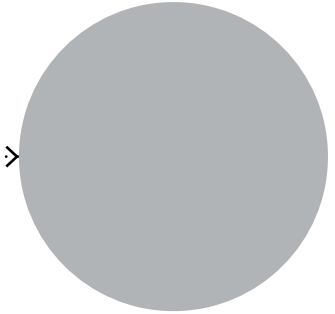
Madhya Pradesh;
Retrofitting Energy-efficient
motor, Solar powering

1 ENTREPRENEUR



Meghalaya;
Retrofitting Energy-
efficient motor, Solar
powering, helping the
entrepreneur get 6 months
of tailoring training

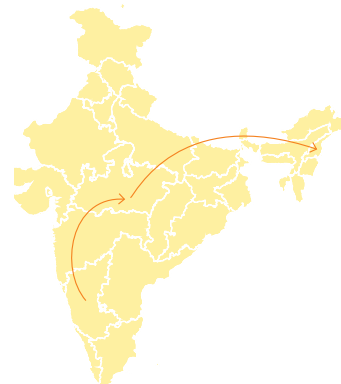
new services?



ENTREPRENEUR
(.....?)
X+
types of user segments
(households, businesses,
students etc)?

REPLICATION CASE STUDY 2 SOLAR POWERED SEWING MACHINE

This technology innovation seeks to combine retrofitting the machine with an energy efficient DC motor and solar powering the appliance; This has been explored for commercial and industrial machines as well. Financing models are yet to be explored. This allows for increased hours of working in the event of grid outages reduces drudgery when compared to the traditional system. It is proven to increase productivity and therefore income generation.



Replicated by:

RRTC - Umran,
Meghalaya



Rural Resource and Training Centre (RRTC) reaches out all the tribes of Northeast India especially to school dropouts and farmers. RRTC has a rich experience in working with rural poor, especially by providing skills training in the organic farming, livestock management, agriculture low-cost and appropriate technology and entrepreneurship. RRTC is known for its agricultural extension services and rural development projects in South Garo Hills and Jaintia Hills, Ri Bhoi district of Meghalaya.

SOLAR POWERED SEWING MACHINE

RRTC - Umran
Meghalaya

Background and Need

The need for solar powered sewing machines (and other productive machines like looms and lathes needed for livelihood generation) has been looked into by the SELCO Foundation technology team over the last 2 years. Through the work, solar powered energy efficient retrofits and products for commercial and industrial

The Replicated Solution

Two end-users were identified for the replication of the sewing machine. N. Joykumari Devi an undergraduate from Tentha Khunjao Naorem Leikai, Thoubal District, Manipur, with an annual family income of Rs. 40,000 – 50,000 and Laishram Chanu Devi from Heibongpokpi, Lamshang PS, Imphal West, Manipur with an average income of Rs. 4000/- per month by working on her existing AC power Sewing machine. Both of them took on a solar powered sewing machine for increasing the family income. Following are the specifications of the machine- Sagar Zig-Zag (Pinion System) Sewing

Impacts and Next Steps

Number of beneficiaries- 1. RRTC wants to look at the intervention both from product as well as skill development points of view. The Training center is convinced that this could be promoted as a good model for solar power

machines at relatively lower costs have been identified and piloted within the organizational network. These solutions have been tested in the field and have shown positive results in terms of addressing the requirements of uninterrupted power and increases in livelihood generation.

Machine, 60W Dynaflux DC Motor, Solar Power solution comprising of: 75Wp Module, 40Ah Solar Battery, 10 Amps Charge Regulator and consumables (for N. Joykumari Devi) and same components are provided to power the existing Sewing Machine of Laishram Chanu Devi manufactured by MERIT Installed for testing and demonstration with 1 year free maintenance. Based on their earning and capability, 70% of capital is expected to be recovered within 1 year. Manipur Rural bank, S3IDF – Selco Incubation, Founders Capital are the partners and stakeholders involved.

contributing to local livelihoods and thereby increase interest in adoption. It has also recognized the possibility of including information on solar powered sewing machines and tailoring into their course curriculum.

Summary

Type of machine

Straight Stitch, Industrial, Embroidery stitch machines

Type of Center

Inbuilt in existing structure, Type of Model- Entrepreneur Run

Partner(s)-

SELCO Foundation(Tech support), Replicated through SELCO India, Pushan, Mangaal, RRTC

Families directly benefited: 10

Current services:

Solar powering, Retrofitting Energy-efficient motors and/or speed controls

Infrastructure Cost-nil

System cost- Rs.20,000/- for straight stitch, Rs.40,000/- for embroidery machines and Rs.75,000/- for industrial machines to be run 8 hours every day solely on solar
Operational cost- Less than Rs.300/-, Rs.500/- and Rs.1000/- respectively for straight stitch, embroidery and industrial machines per annum in most cases

Technical Details

Solar PV Module (60Watt-peak), Battery- Lead acid flooded (40Ah @ C10, 12V), Charge controller (10Amps, 12V) plus respective sewing machine specifications



125 families



Systems financed for Puttur basket weavers community in Karnataka

700+ families



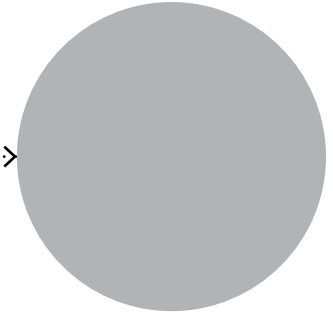
Systems financed by Bhagini Nivedita Gramin Vigyan Niketan, in Maharashtra

10 Families



Systems financed by Mangaal in Manipur with RWUS

New services?

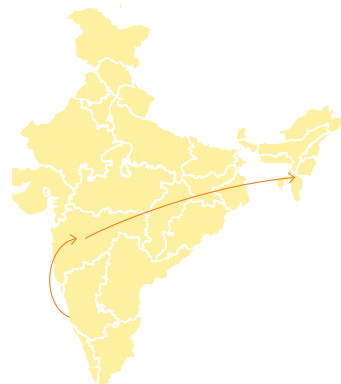


ENTREPRENEUR (.....?)
X+
types of user segments (households, businesses, students etc)?

REPLICATION CASE STUDY 3

REVOLVING FUND (FINANCIAL INNOVATION)

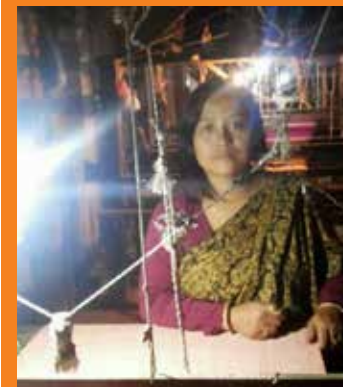
Tribal communities in remote locations are viewed as largely un-bankable. A financial mechanism like a revolving fund can be successfully used to plug in access to credit for remote communities to purchase long term energy solutions. A revolving fund is a fund that is continually replenished as and when loan recipients pay back their loans and the recovered amount of money is used to finance new recipients.



Replicated by:

Mangaal

Imphal, Manipur



Mangaal Sustainable Solutions Pvt Ltd is a social enterprise promoting sustainable energy solutions in Imphal, Manipur. The power situation throughout the Manipur state is very grim. More so in rural areas where many villages aren't electrified. Mangaal addresses this need of accessible and affordable, clean energy access by providing sustainable energy products and services to underserved population living in remote areas with very unreliable power supply and those who continue to be off-the-grid.

REVOLVING FUND (FINANCIAL INNOVATION)

MANGAAL, Manipur

Background and Need

The Revolving Fund innovation and its application in the decentralized energy sector emerged from the need to provide financial mechanisms for purchase of energy systems in areas where end user financing was not possible through the regular banking route, due to the absence of a bank branch or the bank's unwillingness to finance certain end users. The model has been tried and tested in Karnataka and Maharashtra. Loans are

The Replicated Solution

Today, banks in Manipur are comfortable extending loans to Government employees and to those employed in reputed private companies with secure incomes. However, they are hesitant to lend to individuals from the unorganized sector, independent of the actual amount of earnings, including agriculture (the primary profile of Mangaal's customer segment) where proof of income may not exist and the extent of bank interaction is lower (with no existing savings with the bank). The

Impacts and Next Steps

The revolving fund helped beneficiaries such as L. Basanti Devi, Leichombam Mochabi Singh, Mutum Ichantombi Devi, Mutum Taruni Devi, Wahengbam Romen Singh, Pramo Thingbaijam,

extended using soft money to households to purchase energy systems and over a period of time the borrower is expected to repay the cost of the solar system, along with the stipulated interest. The repayment of loans facilitates additional amounts in the fund for further lending. A small commission is taken by the operational partner for maintaining the fund and ensuring collections.

pilot was taken up in Bethel village, Churachandpur district in Manipur. The community mainly comprises of farmers with income levels ranging from Rs. 10,000 and Rs. 25,000 per month. Owing to the constraints associated with bank financing, Mangaal suggested the revolving fund process as a good alternative. The organization tied up with the Rural Women's Upliftment Society (RWUS) in Churachandpur that agreed to take responsibility for collections.

Ingudam Bimola Devi, Chonglheizo and Samuel afford solar systems in the regions of Mayang Langjing, Singjamei, Patsoi in Imphal West and Bethel, Churachandpur, all in Manipur.

Summary

Type of Community- Remote clusters of tribal villages

Type of financial innovation

Revolving fund

Replication Partner(s)-

Tech support: Mangaal

Sustainable solutions

Community Partner:

Rural Women's Upliftment Society (RWUS)

No. of families directly benefiting - 10

Current services:

Soft funding for purchasing solar home lighting systems

Infrastructure Cost-nil

Total system cost- 1,80,000

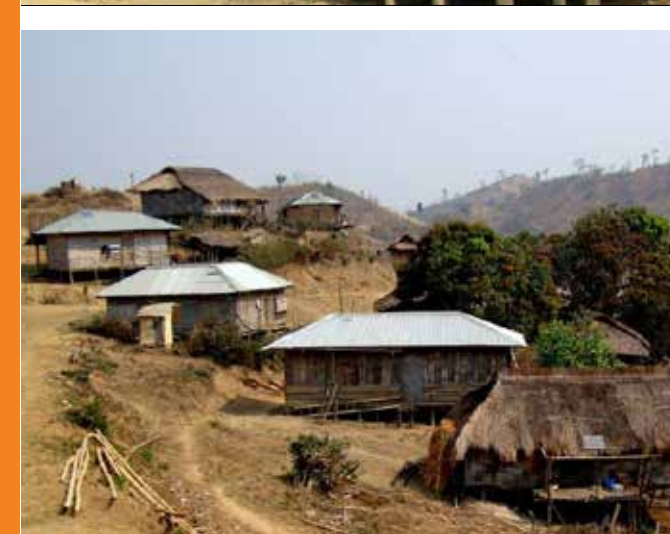
Margin money / down payment

Rs. 5000 per system

Technical Details

Financial Details

Commission for the partner organisation: 7 % of monthly collections, additional commission if collection completed earlier than agreed tile frame



75 Camps



in Kundapur, Karnataka

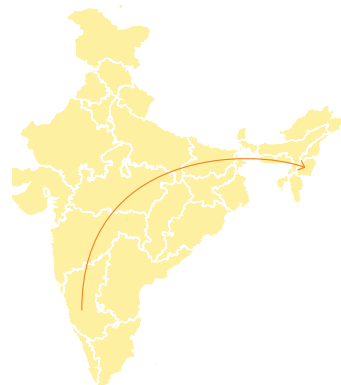


in Belthangady, Karnataka

REPLICATION CASE STUDY 4 SERVICE CAMPS

The concept of Service Camps emerged in Karnataka with the intent of addressing the loss of faith in solar technologies due to the lack of servicing and non performance of systems installed in the past by various solar distributors across the state. SELCO would set up service camps in villages where such systems were installed and service them, including replacement of components as required. SELCO would further enter into an agreement with the community to undertake regular maintenance for these systems in the future. This played a critical role in helping SELCO build trust with end users and establish itself as a solar solutions company, which then became a trigger

for new enquiries and sales in the same regions. Service camps also served as opportunities to reconnect with SELCO's legacy customer bases and introduce them to new products and services.

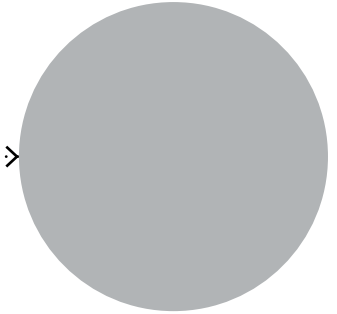


1 Camp



in Manipur

new services?



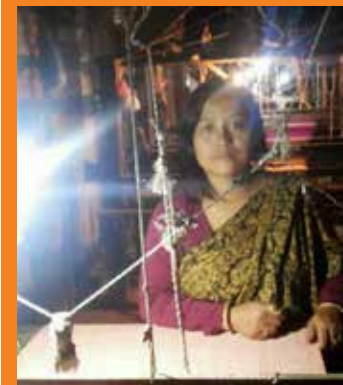
ENTREPRENEUR
(.....?)
X+

types of user segments
(households, businesses,
students etc)?

Replicated by:

Mangaal

Imphal, Manipur



Mangaal Sustainable Solutions Pvt Ltd is a social enterprise promoting sustainable energy solutions in Imphal, Manipur. The power situation throughout the Manipur state is very grim. More so in rural areas where many villages aren't electrified. Mangaal addresses this need of accessible and affordable, clean energy access by providing sustainable energy products and services to underserved population living in remote areas with very unreliable power supply and those who continue to be off-the-grid.

SERVICE CAMPS

MANGAAL, Manipur

Background and Need

The solar market in Manipur is very much a retail market. Cheap, sub-standard components are sold in retail shops that are bought off the shelf and installed by individuals themselves, without understanding the functionality of each component and the need for proper system design. In a short span of time, most of these systems end up defunct or not delivering as expected. To make matters worse, there is no service network available to them, rendering their investments

The Replicated Solution

Maangal replicated the concept of the service camp in Churachandpur district, Manipur. A preliminary survey revealed that 31 out of 53 households were already using Solar Home Lighting Systems (SHLSs) as their primary source of lighting. Almost all of them weren't designed based on the load/ usage, no charge regulators, no proper maintenance of the batteries leading to shorter life of the batteries. The service camp awareness program

Impacts and Next Steps

The program was attended by over 100 villagers in the area and 20 households received servicing by the team. By conducting a service camp in this remote area, Maangal wanted to leverage the opportunity to conduct servicing for existing customers and also bring about awareness through demonstrations for other members of the community. Some who had defunct

worthless. This also affects household perception of solar energy. Mangaal viewed the Service Camps concept as an effective way to solve these issues that were being faced. Service camps would help create awareness on the importance of customized design for solar home systems and timely maintenance, while simultaneously introducing Mangaal's products and services and providing an opportunity for enquiry generation.

was conducted in association with the Village Chief at G. Monglien Village, Churachadpur District, Manipur. It included awareness program conducted on the usage, maintenance and misused Solar Home Lighting Systems. They also inaugurated the event through a key local member which brought publicity and credibility to the event and eventually media coverage to reach a broader audience.

solar systems from other companies or over the shelf purchases. Next steps include conducting many more service camps at incubatee locations and use the camps as an opportunity to promote and build trust in the communities for the concept of decentralised renewable energy as well as to build capacity in the local youth so that they may act as solar technicians

Summary

Type of Community- Remote clusters of tribal villages

Partner(s)-

Mangaal Sustainable solutions

No of families directly benefiting- Program attended by 100 villagers and 20 households received servicing

Current services:

Discounted servicing of solar powered products, SELCO as well as other companies products serviced, customer information updation takes place, awareness and promotion

Cost of a service camp

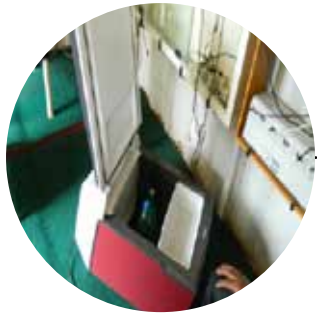
The average cost in Karnataka is INR 4000-6000 but the income generated can range from INR 1000-10,000. The cost of conducting a service camp in Manipur: Rs.25000

Project Nuances

Preparation time: 15 days prior, customer cluster of at least 50 generating a customer list, announcing the camp, conducting marketing activities, systems have been in operation for 3-4 years, all members of the branch present to ensure a strong customer interface, hold the camp near existing financial institution, Potential area of new customers can be mapped with existing customers to leverage the maximum out of a service camp

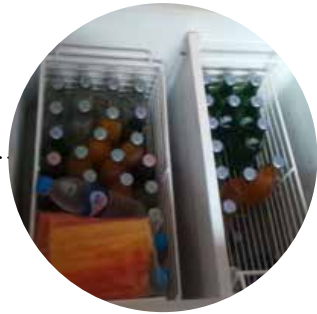


Individual model



Refrigerator: Chotukool
Rural, temple town,
Dharmastala and Peri
Urban, Mangalore,
SELCO India
Cost: 57,000 INR

Entrepreneur model



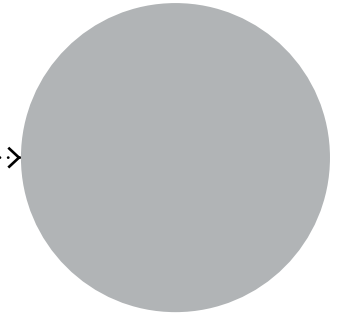
Refrigerator: Western
Urban slums, Tubrahalli and
Vasanth Nagar, Bangalore,
Urban Community Lab,
SELCO Foundation
Cost: 1,05,000 INR

Entrepreneur + Partner



Refrigerator: Phocos
Urban slums, Belandur -
UCL, SELCO Foundation;
Rural, Bailhongal,
SELCO India;
Rural, Rajasthan, Boond.
SELCO Foundation
Cost: 1,10,000 INR

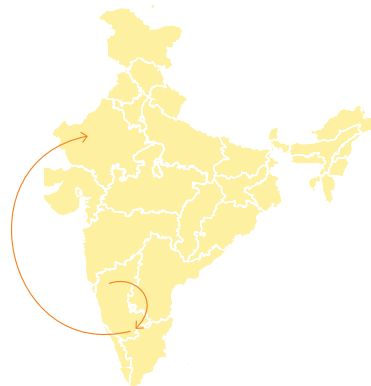
new services?



ENTREPRENEUR
(.....?)
X+
types of user segments
(households, businesses,
students etc)?

REPLICATION CASE STUDY 5 DC REFRIGERATORS

Meeting heating and cooling needs in under and un-electrified areas can be critical to improving livelihoods and health services within a community. Efficient refrigeration solutions are often missing, moreover successful pilots and demonstrations on technical, financial feasibility and impact potential of the solution is unavailable for social energy access entrepreneurs, relevant partners and user segments.



Replicated by:



Boond

Rajasthan

Boond Engineering & Development Products is a for profit social enterprise that provides solar lamps, water filters and mosquito nets to unserved/underserved population living in remote areas of the country as a part of its Boond Development Kit. The mission of Boond is to reach the remotest corner of India with light, clean water and pest control, ensuring an increase in productivity and decrease in disease. The organization also provides a livelihood for the local people by involving them in every step of the supply chain.

DC REFRIGERATORS

BOOND, Rajasthan

Background and Need

Life is not easiest for communities BOOND works with. They live in harsh weather conditions and have difficult access to most basic necessities of life. We at BOOND are trying to not just improve energy access situation in challenging geographies, but we also intend to create

The Replicated Solution

Energy crisis is one of the biggest challenges AMRIT clinic is facing. Many a times due to lack of energy doctors operates on low lights, sometimes even mobile lights are used for delivery of babies. It is difficult to maintain vaccines, medicines and samples of patients at right temperature, as refrigerator does not work for maximum hours. Basic medical equipment like sterilizing machine and baby incubators also need constant supply of energy when in need, which does not happen in times of power cuts. Vaccines must be stored and transported within the required temperature range of +2°C to +8°C at

Impacts and Next Steps

Impacts include: Increased income during summer season for petty shop by over 2-3 thousand rupees. Vaccine and medicine storage for equipment that needs cooling in health clinics is now possible.

Next steps: Phocos is one of the most

a value system that benefits people beyond providing basic lighting solution. One of the most important requirements for better living conditions is better access to healthcare services. It is imperative facilities within reach.

all times. To address this need BOOND has installed a1KW power backup system at AMRIT Clinic in Bedawali village to provide power supply during emergency situations, and also to ensure smooth run of basic operations at the clinic. Solar powered refrigeration unit at AMRIT clinic in Manpur village. The system allows to maintain temperature control between 10 to 6 degrees and also has an automated system of feeding the data to a device which can further be decrypted by manufactures in Hyderabad to know the temperature range inside the refrigerator.

energy efficient, reliable and cost effective solution we have tested and will be actively replicated through incubatees and partners post the pilot stage monitoring and evaluation.

Summary

Type of Community-
Remote villages

Type of DC Refrigerator:

Inbuilt in existing structure,

Type of Model- Entrepreneur

Run + Partner

Partner(s)-

BOOND Engineering &
Development Pvt. Ltd.

Aajeevika Bureau, AMRIT Clinic

No of families directly

benefiting- 200+

Current applications:

petty shop (colas, vegetables,
milk, curd and other perishables)
Health (medicine storage)

Infrastructure Cost

System cost- Rs 57000 (35
liters), Rs 105000 (230 liters)
to Rs 110000 (240 liters)

Technical Details

Basic refrigeration : Chotukool
(Panel 300 Wp- Battery 200Ah,
12 V/40Amp CR), Western
(Panel 350 Wp- Battery 200Ah,
12 V/40Amp CR), Refrigeration
and Freezer : Phocos (Panel
300 Wp- Battery 200Ah, 12 V
inbuilt CR)





SELCO
Incubation Centre