# Energized Livelihoods

A Collection of Different Approaches and Stories Showcasing SDG7 and Productive Use Equipment that Catalyze Sustainable Livelihoods

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## STORIES

# INTRODUCTION

Humanity is bracing itself for an increasing spate of climate related events - like droughts, floods, cyclones etc. The COVID crisis seems to be trivial compared to climate change induced disasters, though in this case a mere vaccine will not help the human species from tackling its aftermath. Today, most of the brunt is being fronted by the poor across the world.

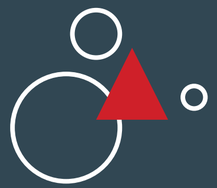
Depleting water resources, vagaries of monsoons, extreme temperatures etc. are some of the events that are making poor families defenseless. The consequences are ever grinding poverty, migration to unknown lands, social strife, trafficking etc. Time has come to create and implement appropriate solutions that can make the poor climate resilient. Today, there is strong and overwhelming evidence to prove that Decentralized Renewable Energy (DRE) led solutions can be that glue between development, access to essential services and climate adaptation.

The multiple case studies in the book, show case the effectiveness of DRE in making society inclusive and environmentally sustainable. Each case study brings to light the importance of decentralization, localization of ownership and end-user centricity. Democratization of program designs have led to stronger ownerships and effective financial and delivery innovations. This book hopes to bring to light the need of customization of solutions for effective impact, adoption and scale to take place: leading to robust models that are long term and in numerous ways showcase true inclusivity to rest of the world.

Farmers awareness and Solar Powered Productive Use Equipment showcase event for Tomato Farming in Andhra Pradesh, India

# Approach

# DECENTRALISED SOLUTIONS





## Production by masses, not mass production

**M.K. GANDHI**

Remoteness, the increasing frequency of disasters and unequal systems exacerbate marginalisation. A one size fits all approach, the acute de-coupling of ownership and utilisation of productive use assets are attributes of our existing paradigm, which hinder sustainable development. While some of these attributes linked to geographical, human settlement and climate contexts may be difficult to alter, the others – linked to how solutions and services are delivered are very much under our control. Since the onset of the industrial revolution, technological developments have been characterised by centralisation. This form of development is causing unreliability and inaccessibility of services at the last mile, inefficiencies in practices, inequitable distribution of value and unnecessary climate impacts caused due to elongated supply chains and compulsively homogenised systems.

In this historical trajectory of development, decentralised solutions, ownership and enabling environments provide a promising and contrasting value. Decentralisation focuses on shortening of supply chains and self-reliance - this is specifically important in the context of climate change. Disruptions due to sudden climate shocks, can pose an additional burden on low-income communities in accessing services related to health, livelihood and well-being. In many cases, these communities are unable to bear said additional costs which result in loss of life, loss of livelihood, debt and loss of critical assets. All of these can potentially result in the formation of generational poverty furthering inequality.

Decentralisation of energy access, thus enables a sustainable method of inequality reduction, independence and in building safety nets. Furthermore, decentralisation can lead to regional growth, enabling local governments, institutions and stakeholders to have: better control over their resources; access to knowledge; greater influence over deployment and allocation of infrastructure; development of inclusive agendas and contextual solutions.

DECENTRALISED SOLUTIONS

# #1
# Solar Powered Cold Storage

Decentralised and accessible cold storage for farmers to gain higher incomes from arbitrarge and protect unforeseen losses, all while reducing wastage at the farm gate and preserving our food.



## The Challenge

Farmers lack access to cold storage facilities which lead to a lot of wastage of produce. The current state of cold storage infrastructure are large scale, centralised (in terms of ownership and capacities), consuming a lot of electricity as well as diesel through generators as they need to be powered constantly to avoid spoilage. Farmers often have to travel long distances to access these storages increasing costs or through traders increasing transport emissions.

**Food spoilage rates are estimated at 30% in India due to inefficient cold-chain networks**

Factors Leading to Losses and Wastage in the Supply Chain of Fruits and Vegetables Sector in India - Saurav Negi and Neeraj Anand

# The Solution

The off-grid cold storage unit showcases complete elimination of diesel generators in locations with as high as 15 hours of daily power outages. The advantage of the solution is that the off-grid solar integration and universal thermal energy storage can seamlessly be integrated to any cold chain application without changing the cooling hardware. Energy storage systems are exactly the same for milk chillers and cold storage, which translates to replicability and scalability of the technology.

A solar powered cold storage unit in Odisha, India



A solar powered cold storage unit in Karnataka, India

**India's total cold storage requirement is 62,000,000 MT which if centralised is replaced with decentralised cold storages, can reduce 33,945,000 MWh energy units per year. 29 coal fired plants can be avoided if moved from centralised to decentralised cold storage units**




**Watch the video- Click Here**

**A Farmer Producer Company in Jharkhand, India uses Solar Powered Cold Storage and Agro - Processing Machines**

# #2
# Solar Powered Millet Processing Units

Decentralised access to value addition services - meeting local needs and creating opportunities for new livelihoods and income sources for marginal farmers.

## The Challenge

Millet processing involves pre-cleaning, destoning, hulling and processing, which in the absence of processing machinery take days to do manually. This activity is wholly undertaken by women. Millet processing machinery is critical to reduce drudgery and increase the uptake of millet production; as millets do not provide good returns at the farm gate and have a much higher value after processing.



Ground millet flour at a solar powered millet processing unit

**India's millet production in a year is 1,61,40,000 tonnes – which if replaced with decentralized solar powered energy efficient millet units can reduce 513,737,376.0 KWh energy units in a year.**

A member of a Farmer Producer Company packages her processed millets

**0.4 coal fired plans can be avoided if moved from centralized to decentralized millet processing units which has a GHG mitigation potential of 2052.92 kgCo2e/unit/year.**



## The Solution

For all post harvest processes, a decentralised millet processing unit with grader, destoner, dehuller, polisher (optional) and flour milling machines would serve all of the farmer's post-harvest processing needs.

Decentralised small-scale units can be hugely beneficial to farmers and in boosting the rural economy. Farmers could consume their own produce, sell for higher values and also use every part of the crop within their farms itself. Even the post processed waste (20% of the crop) can be turned into animal feed.

Value added products can also be made locally through collectivization seeing higher returns for farmers.

Watch the video - Click Here

**A Micro-Entrepreneur in Karnataka, India uses Solar Powered Flour Mill**

# Approach

# RESPECTING PLANETARY BOUNDARIES



## Decoupling Development and Energy Consumption

Today, 759 million (1 out of 10) people do not have access to electricity, and millions still lack access to affordable and reliable energy. As the world focuses on lessening the developmental gap between the have and have-nots, energy demands are bound to grow. More importantly due to lack of energy optimized innovations for development of resource constraint populace, the energy consumption patterns will grow in a manner that will lead to further burden on the poor.

This can already be seen in many developed countries as well, where lack of optimization in technology driven solutions for low-income communities have resulted in increased energy poverty.

Thus, in order to meet the developmental needs of low-income communities, and improve their capacity to adapt to climate change, optimisation of solutions is critical. Solutions should be designed to relook at production and consumption patterns, and set new benchmarks. Current efficiency efforts and energy programs don't challenge that paradigm and focus only on reducing already inefficient ways of energy consumption.

A Decentralised Renewable Energy driven approach to problem solving, one that's driven by putting the need of the marginalised at the core, results in solutions that are socially, environmentally and economically viable. The solutions coming out of this approach reinforce that decarbonization, climate resilience, and poverty alleviation can be mutually reinforcing.

# #3
# Solar Powered Hydroponics for Animal Fodder

Decentralised access to essential livelihood inputs while curbing hamful land-use caused due to monocropping

## The Challenge

Fresh green fodder or manufactured animal concentrate feed are essential needs for sophisticated animal husbandry practices today. The need for manufactured feed increases in conditions where natural fodder availability may be extremely scarce due to climate, terrain or other factors.

View from Urmul's solar powered hydroponics unit

In the current paradigm, feed is manufactured by large centralised industries. Input materials utilised by such industries are sourced largely from different regions of india, where monocropping methodologies are utilised extensively, these have negative climate impacts. Long supply changes, connecting the raw material suppliers to the concentrate feed manufacturers and thereafter to the end user of the animal feed result in a large quantity of CO2 emissions along the way.

Solar powered hydroponics unit for animal fodder with Urmul Trust in Rajasthan

Maize micro-green fodder grown in the solar powered hydroponics unit

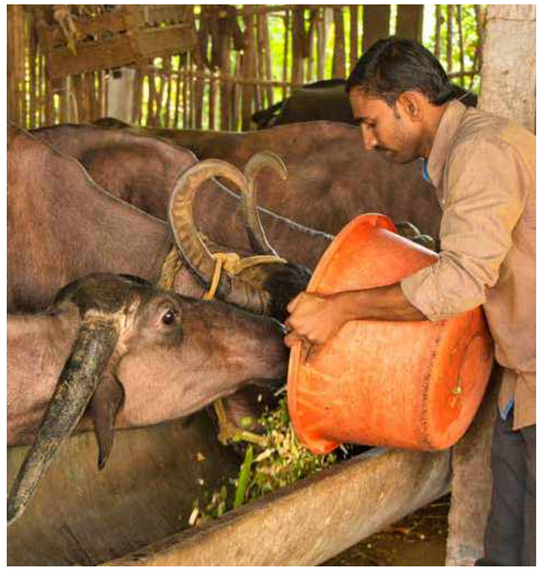
**India is facing an extreme animal feed shortage, which is a major factor behind the recent rise in costs of milk production. Government estimates suggest that the area under fodder cultivation has remained static for the last 4 decades, while the lands available for grazing are reducing or have been degraded.**

**According to the report Revisiting National Forage Demand and Availability Scenario, there is a deficit of 23.4% in the availability of dry fodder, 11.24% in that of green fodder and 29.9% for concentrates.**

Focus needed on fodder shortage in India - The Hindu BusinessLine
Indian Fodder Scenario: Redefining State Wise Status, Publisher: AICRP on Forage Crops and Utilization ICAR-IGFRI, Jhansi

## The Solution

Vertical farming of micro greens using hydroponics has the potential to completely replace the need of concentrate feed providing the same nutritional value to animals at a fraction of the cost and land utilisation. Solar powered, decentralised hydroponics for animal fodder are proving to be a disruptive solution to the convoluted problem of animal feed manufacturing.



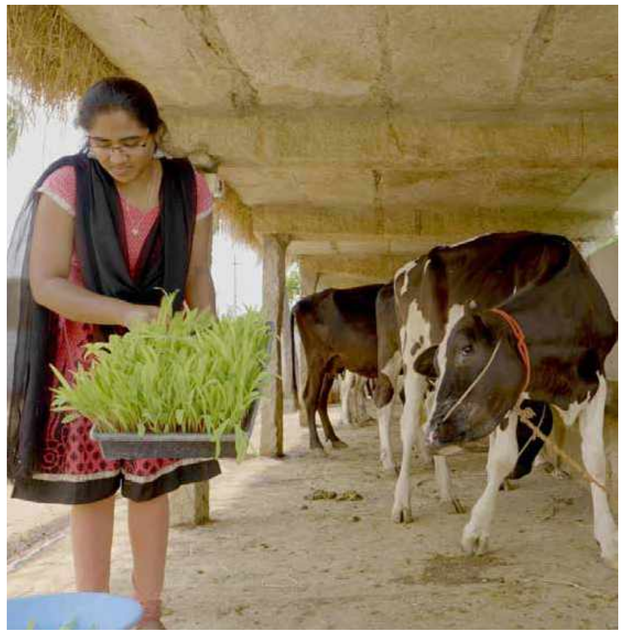
**A total quantity of 80,000,000 MT of feed is required per year to feed India's cattle which if replaced with decentralized solar powered hydroponic units can reduce 14,310,495,733.33kWh of energy units per year. This has a GHG mitigation potential of 344,45 kgCO2e/unit/year**

A solar powered hydroponics unit for animal fodder



[Watch the video -Click Here]

**A Dairy farmer in Andhra Pradesh, India uses Solar Powered Hydroponics**



The solar powered hydroponics solution has reduced my dependency on the grid and provides rich and nutritious fodder for the cows closer to their location. There is an increase in the rate of milk yield along with quality of the milk. This has increased my income by 25 percent.

**JEEVANA - DAIRY FARMER**

Paravva using a solar powered roti rolling machine in her old home and workspace

RESPECTING PLANETARY BOUNDARIES

# #4
# Productive Workspace for a Heat Stressed Home Business - Bread Making Unit, Retail Store, Small Eatery

Need based built environment design improving space utilisation, hygience, employee comfort, combatting heat stress and impacting overall well-being.



## The Challenge

In many workspaces, such as the one where Pravva was working, there are daily struggles associated with work during the afternoons and the summer months due to extreme heat. The internal temperatures of workspaces would rise up to 38°C to 40°C due to the tin sheet roofing that canopies homes, the low ceiling and the lack of openings like windows for ventilation. The temperature is raised by 3°C to 5°C by the presence of active heat sources,such as, the cook stove used to make the rotis. This prevents shopowners from working a good 4-5 hours in the day due to the extreme heat and low humidity levels in a small 100 sq ft area.

Additional fatigue was caused by poor adaptation of a home into a workspace. Due to the lack of proper storage, all the rotis she used to produce would be stacked on the floor. The cook stove was kept on the floor that would result in poor posture and back strain.

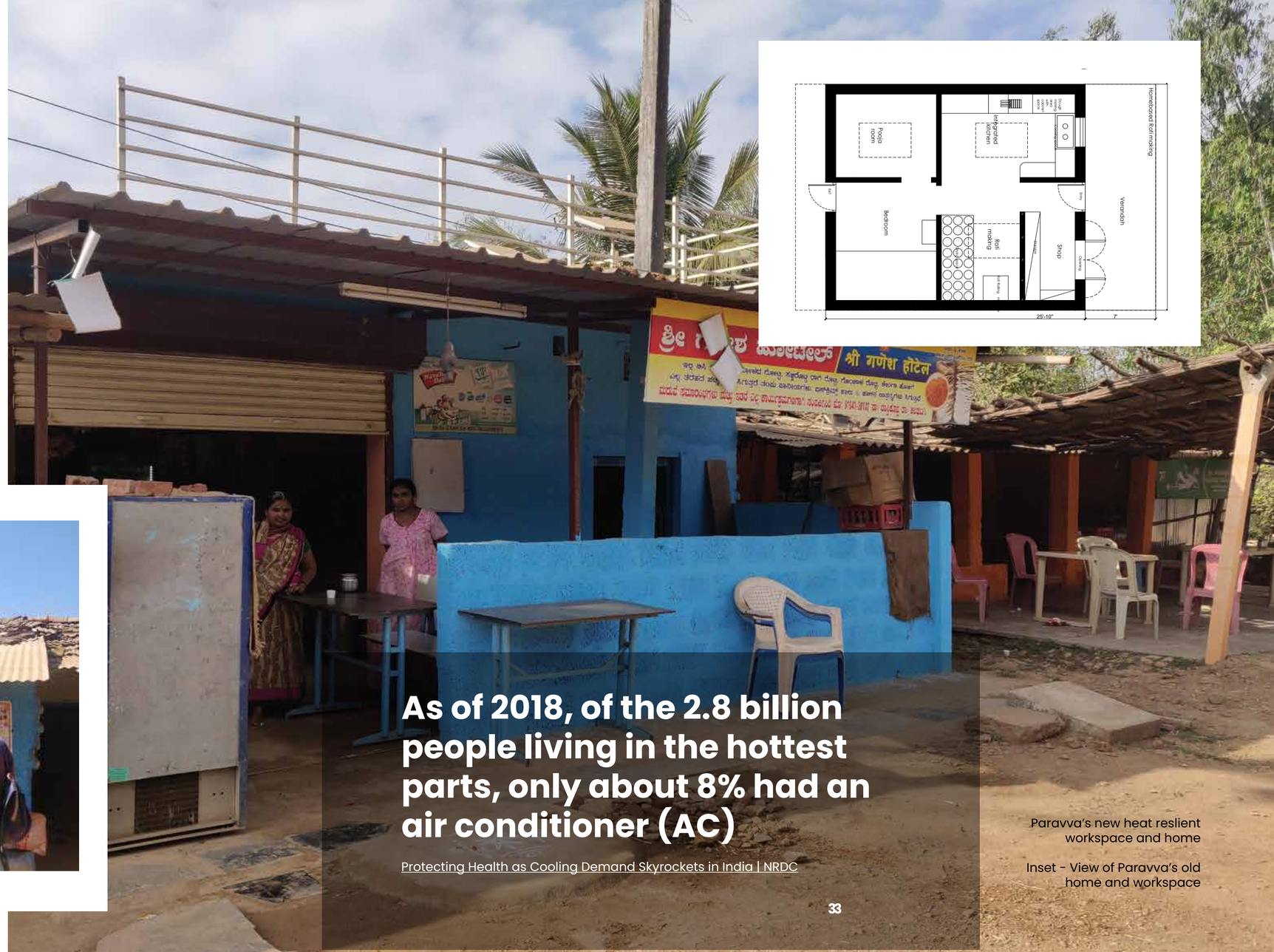
**India's 2021-2022 Economic Survey estimates that it could lose 5.8% of its working hours, equivalent to 34 million full-time jobs in absolute terms, to heat-stress events by 2030.**

# The Solution

To reduce radiant heat from such roofs, insulated roofs are installed. The layout of the space is (accordingly) modified to allow for better flow and efficiency, hygienic storage, improved ventilation and lighting.

To promote ventilation within such spaces, a turbo-ventilator is installed above the cooktop to provide efficient exhaust for the smoke and heat through stack ventilation. By providing a skylight, daylight could enter the space during the working hours, which increased lux level to 100-120 and optimized energy usage to a point where no lights were used during day time.






**As of 2018, of the 2.8 billion people living in the hottest parts, only about 8% had an air conditioner (AC)**

Protecting Health as Cooling Demand Skyrockets in India | NRDC

Paravva's new heat reslient workspace and home

Inset - View of Paravva's old home and workspace

After the construction of the new roof, we feel so comfortable within the space that we don't feel the weather outside anymore. It always feels good to be in the house to work. The turbo ventilator has, also, made our job easier by providing adequate ventilation and heat exhaust (over the cooking stove)."

**PARAVVA - ENTREPRENEUR**

Ventilation consideration made for the new workspace

**A recent Economist Intelligence Unit report suggested that reducing electricity demand for cooling by 10-75% through wider measures such as improving infrastructure design could allow for a quicker transition to next zero emissions by 2-8 years**

India's Tricky Path To Cooling Itself Without Warming the World – The Wire Science



Glimpses of Paravva's new workspace and home

After the modification of her workspace, Paravva has been able to increase her productivity from 100 to 150 rotis per day to 300 to 450 rotis per day. She has started a small restaurant to provide meals along with her roti shop.

**Watch the video -Click Here**
**Hear about Paravva's experience of her new workspace**

## Approach

# INNOVATIONS FOR CLIMATE ACTION



Innovating for solutions that help communities improve their resilience, adapt and mitigate climate change

According to the latest IPCC report, climate-related risks to livelihoods, food security, health and water supply, are projected to increase as the planet warms. With the increasing disparity in incomes and access to services, adaptability to the rapidly changing climate is becoming harder for marginalised communities. The emissions growth, with little choice, results primarily from energy use associated with economic development. Uptake of inefficient technologies which consume dirty fuels or high amounts of energy result in higher emissions.

Much of the Global South, including India, is exponentially more vulnerable to climate change and its devastating impacts. Extreme heat waves, droughts, tropical cyclones, floods, irregular rainfall, and shifting monsoon patterns are all packed into the region. Individuals and communities' capacity to cope with climate variabilities is dependent on the services, opportunities and institutions available to them.

In the context of low-income communities, adaptation and mitigation strategies need to be inter-linked. Strategies for adaptation - all those responses to climatic conditions that reduce vulnerability should be an integral and urgent part of overall poverty reduction strategies. Adaptation should not be approached as a separate activity, isolated from other environmental and socio-economic concerns that also impact development opportunities for the poor. Mitigation is needed so countries can move swiftly to a sustainable society; and adaptation so that many of the poorer families, that are already facing the brunt of climate change in their everyday lives can avail alternate and more resilient livelihoods or wellbeing.

With climate change being an extremely real and pressing threat, the need is to change priorities for innovation to adaptation - innovations that are driven by sustainable energy and decentralisation can help the under-served respond to climate change today. The response will be done in a manner that mitigates extreme climate disasters in the near future.

# #5
# Cyclone Resilient and Solar Powered Artisinal Workspaces

Energy efficiency in building practice and climate sensitivitiy in building material selection for comfortable and long-lasting workspaces.

## The Challenge

In the tropical semi-arid region of Puri, Odisha with high annual temperatures, cyclones, flooding and rainfall, Chakradhara and his family are engaged in the pottery trade. For such communities, their main source of income is providing clay pots for the Jagannath temple network. They face multi-disaster stresses from extreme heat and humidity as well as recurring cyclones from the Bay of Bengal. T

he houses and workspaces in Kumbharpada, which were traditionally built with 1ft thick mud walls and thatch roofs –due to the ongoing effects of climate change resulting in unprecedented rising temperatures, increasing numbers of cyclones, with wind speeds reaching 250km/hr from the Bay of Bengal, these traditional homes are easily devastated.

Devestation from Cyclone Fani



Repeated construction of the homes and workspaces places the families in Kumbharpada under great financial strain. It costs them roughly US $10,000 to re-build a home, or US $5000 for annual repairs.

Adding to this, the indoor environment of these spaces is extremely uncomfortable. While outdoor temperatures rise up to 45°C and humidity well over 75%„ usage of inefficient materials like asbestos and metal sheets further increase indoor temperatures to 50°C-55°C.

The pottery kiln used to bake the pots are also within living areas and workspaces resulting in high and unsafe pollution levels, heat stress, breathing problems and asthma.

The situation of these potters has only been worsened by the COVID-19 pandemic. The lockdown of 2020, occurring soon after the destruction by the cyclone Fani, made it very difficult for the potters to maintain their businesses. With the selling of pots at an all-time low, many of the potters have looked for alternative options to sustain an income; many becoming construction laborers.

Potter's home and workspace before the new built environment solution in Odisha, India

# The Solution

To ensure cyclone resilience, the following designs have been incorporated: Pitched roofing to withstand the wind load on the roofing, ; Square planning as a resistance to the impact on the built structure during heavy winds; Monolithic structural frame members to take up the wind load on the structure during the cyclone. ; Raised plinth structure (by 1.5') to prevent the flooding of space

To provide for comfortable working conditions, the design was made to incorporate the following: Arrangement of spaces so as to mitigate heat generation from active heat sources within the space and ease of work. ; High ceilings for ease of smoke removal; Ample amount of openings for proper ventilation; Shaded spaces for pot drying - important during the monsoon; Use of bricks and pots (for ceiling) made by the potters - to reduce the amount of cement usage while maintaining the thermal efficiency of the roof; locally sourced materials - reduced the need for transportation; Efficient kiln design incorporated - reduces the amount of smoke in the space.



Newly built potter's workspace

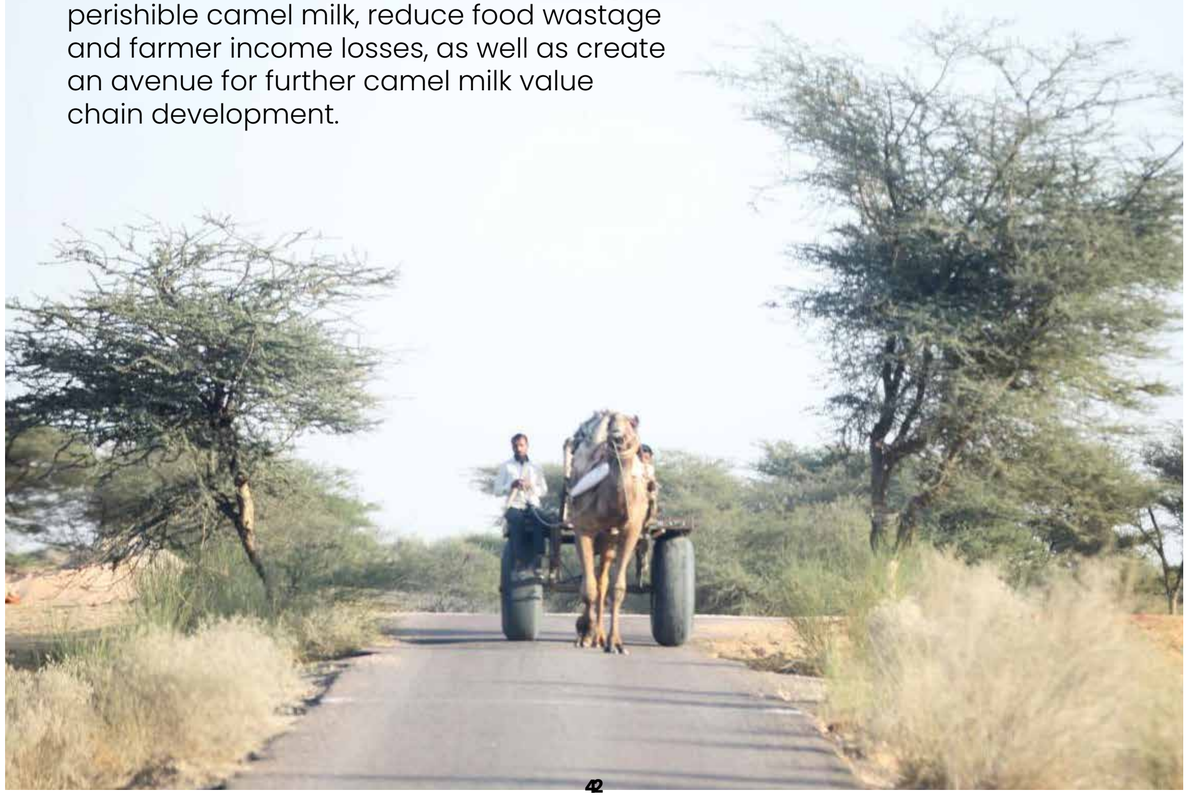
By providing space that is comfortable and cyclone resilient, the potters have been able to carry out their daily tasks in comfort and security. Cyclone resilience has ensured financial security as repeated construction of their homes and workspaces will be prevented.

With (cyclone) Fani, we had seen massive devastation to our homes, batighar (pottery shed) and markets. The construction of the resilient shed gives us hope to revive our business.

**CHAKRADHARA, POTTER**

# #6
# Solar Power for Camel Milk Cold Chain

Unbroken cold chain links to preserve highly perishible camel milk, reduce food wastage and farmer income losses, as well as create an avenue for further camel milk value chain development.



Camel transport en-route to a solar powered camel milk chilling unit in Rajasthan, India.



## The Challenge

Camels in Rajasthan have historically enjoyed a high popularity and demand for heavy power work. Camel milk too is consumed by rearers and local populations however, the absence of organised markets, technological capacity sustainably integrating camel husbandry into the modern economy and lack of infrastructure to maintain the quality and shelf life of camel milk value chains has resulted in spoilage of milk at centres and losses for camel rearers.

Camel Milking in Rajasthan, India

# The Solution

One of the activities in the camel value chain and dairy at large, that plays a critical role in keeping quality of milk intact is cooling of milk before it gets processed. Milk being a highly perishable product needs to be chilled to ~4°C at the earliest to arrest bacterial growth and retain its quality.

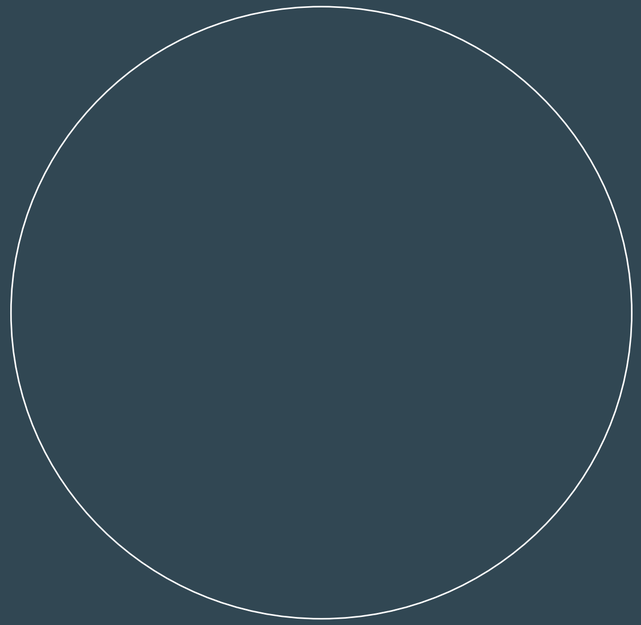
In Rajasthan, the scattered camel herders and farmers face challenges due to the lack of local collection centers with appropriate cooling solutions. With just around 3 hrs of shelf life, camel milk greatly benefits from decentralized cooling infrastructure. Thus, decentralized cooling, enabled by solar energy in these areas with abundant sunshine and unreliable electricity one can strengthen the livelihoods of smallholder camel farmers by reducing their transaction costs and wastage of milk.

A camel farmer depositing her camel milk from the day in the solar powered milk chiller

Operator of the Solar Powered Milk Chiller

# Approach

# INCLUSIVE INNOVATION





## Innovations on technology and delivery models that allow for equal access and opportunity

In the previous decades, innovations catered to, and were driven by the top 10% in the economic strata. It was believed that the trickle-down effect would eventually bring prosperity to all.

For too long, a one-size-fits-all approach has been adopted which is insensitive to local contexts of the underserved. The issues faced by these communities are complex in nature and require ingenious technologies along with pioneering social and financial solutions and entrepreneurs that have the vision and patience to drive transformative change.

Additionally, there is evidence to show how the most vulnerable populations are also exploited to perform the most drudgery driven tasks. “According to a 2021 report from the United Nations Economic and Social Commission for Asia and the Pacific, there are nearly 472 million persons with disabilities within the APAC region. Usually, wheelchair users are restricted within the four walls of their home and that, in turn, affects their participation with the community and social development. The issues of meaningful work, inclusion and productivity are critical for enabling and integrating Persons with Disabilities to mainstream society to realise their full potential.

Decentralised Renewable Energy solutions improve accessibility, reliability, opportunities resulting in productivity and ease at work. This allows for increasing reliability, improvement in quality of the existing livelihood as well as helps in diversification and value addition resulting in increased incomes. Additionally, “Innovation” has often focused on technology alone, and not on processes around ownership models, financial models, supply chain and service delivery models. Broadening of the definition allows for improved access, viability of livelihood opportunities and sustained impact of the technology.

INCLUSIVE INNOVATION

# #7
# Disability Focussed Livelihood Solutions

Livelihood selection, product design and technical adaptations to meet the needs of disabled individuals - an example for many other innovation opportunities.

A n entrepreneur uses a conventional solar powered roti rolling machine with a foot press pedal

## The Challenge

Micro and non enterprises majorly contribute to the employement of the labor force. They help smaller towns, villages and intermediary cities with development spaces to aid bridiging the gap beteween rural and urban economies. Data on disability points to a correlation between ‘disability’ and ‘poverty’. A large number of people with disabilities are born in to poor households. This is not just a mere coincidence. This is due to the fact that pregnant mothers have to work until the very late months of their pregnancy under very harsh conditions to make ends meet.



Disabilities in low income groups struggle with lack of support, lack of livelihoods, income and social mobility. There is a need to make exisiting livelihood opportunities accessible to persons with disability which can be achieved via simple ergonomic adjustments, modifications to hardware operations and appropriate delivery and financing models. While there remains a dearth in solutions available, any new innovations designed with respect to disability can lead to more accessibility of solutions in general.

Left - A typical roti

Right - A conventional roti rolling machine with a foot pedal

## The Solution

For disabeled enterprenuers, such as Hanumanthappa, a physical diasbility left him unable to contribute towards his family's overall income. A solar powered roti rolling machine was implemented after appropriate modification s, to enable Hanumanthappa to have a home-based livelihood. The machine design was modified to make it ergonomic and user friendly, catering to his specific needs. A traditional roti rolling machine can be operated only with legs. Since the end user is wheelchair bound, the machine was modified to be operated by hands alone.

Hanumanthappa using his modified solar powered roti rolling machine while his mother prepares the dough

**Census data from India also suggests that 69% of the disabled population reside in rural areas.**

Moulali, aflicted by a spinal cord injury using his solar powered computer and printerin his newly renovated solar powered and energy efficient home


Similar considerations for inclusivity made across various types of technologies and livelihoods, ergonomic adjustments in the machines, as well as in the overall built environments can ensure reduced physical stress, increases ease of work and create new opportunities for livelihood.

**Watch the video -Click Here**
**Hear about Moulali's experience of his new livelihood and home**

INCLUSIVE INNOVATION

# #8
# Solar Powered Rental Models for Lac Pruners and Sprayers

Rental models for seasonal use technologies, reducing drudgery and enabling accessibility for remote end-users.

A Lac Bangle making unit in Jharkhand, India



## The Challenge

Non timber forest products have, for many years, been seen as viable livelihood opportunities, especially for those from rural, remote and indegeneous and/ or economically marginalised communities. These livelihoods however are generally labour driven, and do notusually involve large capital, and thus are usually a source of secondary income.

Lac rearing specifically involves a number of practices: pruning, inoculation, spraying, and harvesting. Laborers are able to prune 1-2 lac bearing trees per day through manual pruning methods. To prune a tree it would take about 1-2 hours, the activity involved is extremely physically straining. Lac pruning is mostly carried out by women and traditionally women within these communities wear sarees which makes climbing a tree less tactful causing injuries and falls. Lac needs to be reared within 7-8 days of rearing, which means laborers have to be efficient with the number of trees they attend to in the season .
The forest areas are poorly electrified and additionally, they face frequent power cuts, limiting mechanisation.

Farmers harvesting and spraying lac using manual, tiresome and unsafe methods

## The Solution

The intervention worked on by SELCO Foundation is a Solar Powered Lac Pruner. The lac pruner uses an inbuilt battery, which is usually charged at night and used during the day. The solar energy system installed also powers and charges a Solar Powered Lac Sprayer

Due to the technology, 10-12 feet deep pruning can now be conducted by farmers in an easy and safe way. The systems are owned by producer groups comprising of 30-80 farmers in each group. Farmers part of the group rent the system for the group for the number of hours/days that they use the system.

Financial optimisation was a critical part of the model creation. Pruning itself is a highly seasonal activity and the number of trees which community members can access are not more than 10-12 on average, making ownership of the technology by each farmer uneccesary . Solar panels are installed at one house where the lac pruner is charged. From there, it is rented by women depending on their needs.

An SHG member in Jharkhand with her rented Solar Powered Lac Pruner



**With a dependency of more than 275 million people of India (27% of the total) for their subsistence and cash livelihoods, the NTFP sector is one of the largest unorganized sectors with a business turnover of more than INR. 6000 crores per annum. NTFP contributes to about 20 to 40% of the annual income of forest dwellers (89 million tribal people)**

Mathur R B and Shiva M.P, 1996

# Approach

# BUILDING ECOSYSTEMS TO SCALE



## Capacitating and building systems that result in multifold impact through replication`

Systems thinking is a holistic approach to analysis that focuses on the way that a system's constituent parts interrelate and how they work over time and within the context of larger systems. SELCO Foundation has been following a systems-based approach in order to understand the root cause of a developmental problem, and also to design programs which over a period of time are able to solve the problem in a systematic and sustainable manner.

Developmental contexts and institutional capacities change from one geography to another. Additionally, climate change affects geographies and people in varying ways - and solutions cannot be standardised. An ecosystem approach to innovation takes a systemic approach which brings together: technology innovation, financing, delivery model, incubation, human resource, and policy. It also advocates for local ownership and allows for development of local innovators and enterprises, which is critical in order to build systems that adapt quickly to localised climate and poverty challenges.

The most developed ecosystems are ones which allow for innovation to thrive and replicate in a manner that increases prosperity for everyone. Societies have been able to accomplish this in the past because of strong collaboration between stakeholders across government, civil society, philanthropy and business. Such systemic changes result in not just growing the impact multifold, but also result in improved resilience where local systems are able to respond to local needs in a more lean and efficient manner.

BUILDING ECOSYSTEMS TO SCALE

# #9
# Partnership with Meghalaya State Rural Livelihoods Society (MSRLS) and Meghalaya Basin Development Agency (MBDA)

Partnerships with the Government Agencies, Training of Trainers, Financial Linkages and Joint DRE-Livelihoods Scale Program Development

## The Challenge

For reaching out to and working with vulnerable communities, traditional market driven channels may not suffice. In certain regions, civil society organisations may fill the gap of reaching out to end users, however the largest stakeholder with access to human resources, networks and the ability to reach the last mile remains the government. The Indian governement's livelihood mission, corresponding state livelihood missions and other livelihood development programs by governments have the ability to scale DRE-Livelihoods and converge stakeholders in a directed manner. However, mechanisms of these programs need to be clearly identified and tested, with risks mitigated.

**Above -**
Training of trainers program with govern departmental staff in Meghalaya.

**Left -**
Solar Powered Turmeric Processing Unit in operation by an federation of turmeric farmers in Meghalaya,

# The Solution

SELCO Foundation has been working with governmental departments across its regions of activity. However, its relationshop and programs with governmental departments in Meghalaya have made considerable progress in moving towards creating an equal platform for accessibility of solutions by all individuals in Meghalaya. The government, is aiding SELCO Foundation in identifying and testing appropriate models for scale - like training of its departmental staff on DRE-Livelihood opportunities, end user selection processes, financing processes and so on. Learnings from this program are relevant for not only the foundation and the sector in India, but similar activities across the global south.

A concluded training session with departmental staff from Meghalaya State Rural Livelihoods Society (MSRLS)

An Eri Silk Spinner from Meghalaya

A poultry rearer from Jharkhand Women's Self-Supporting Poultry Farmers Cooperative Federation Limited (JWSPCFL) uses a solar powered poultry lighting solution

# #10
# Scaling Solar Powered Lights for Poultry with a Women's Co-operative and Governmental Partnerships in Jharkhand, India

Building on exisiting ecosystems with ongoing financial and livelihood transactions to integrate DRE Livelihood solutions



## The Challenge

Jharkhand has a poultry population of 18.10 million making poultry rearing a prominent livelihood in Jharkhand. It is estimated that over 50 % of land less and marginal farmers depend on small scale poultry rearing. It is found that the lack of having scientific techniques for poultry rearing has been a key issue in low productivity. A small scale farmer on an average owns about 400-500 chickens and is able to rear only 4 batches per year against the optimal 6 batches per year. This has dramatic cost and income implications for the poultry farmer primarily due to the cost of feed.

Poultry feed - Dr. Sankar Dutta, Rajiv Gandhi Foundation

# The Solution

Jharkhand Women's Self Supporting Poultry Co-Operative Federation LTD., a cooperative that organizes remote rural women farmers into collectives, creating systems and processes for them to attain industry competitive production and scale efficiencies. Solar powered lighting solutions were implemented for individual farms. The farms hold 400- 600 chickens per batch. The renewable energy lighting solution aims to keep chicks awake to feed which influences the chicken weight and hence improves the feed conversion ration. Today over 1000 poultry farmers have been able to access the solution via loans offered to them via their own co-operative. The co-operative is able to borrow money at larger scale and extend the financing solution to its members. Costs for the solar powered light are deducted every month from the payments made to the farmers by the co-operative. Many farmers have also been able to utilise government funds from the aspirational district program increasing accessibility even further.

A poultry rearer from JWSPFL uses a solar powered poultry lighting solution

Poultry rearers from Kesla Poultry Collective in Madhya Pradesh, where the poultry co-operative movement began - Dr. Sankar Dutta, Rajiv Gandhi Foundation

**Watch the video -Click Here**
**Learn more about the solar powered poultry lighting solution and the cooperative model**

A solar powered poultry farm

A solar powered puffed rice making unit in Karnataka, India



# NEXT STEPS

The world is less than 8 years away from the deadline of United Nations Sustainable Development Goals (SDGs). Numerous nations are far behind in meeting their promised targets. The reasons are plenty, and one of them being unable to balance innovation, scale, diversity, and customization.

The book emphasizes the importance of processes and the need to scale them up by customizing it according to the maturity of the local ecosystems. Scale via replication should be the mantra that lays importance to local needs while making each intervention socially, financially and environmentally sustainable. The SDG7-SDG8 linkages, as showcased, prove the effectiveness in making it a level playing field for the poor, while enabling them to face the brunt of climate induced disasters.

The solutions are not for all types of scenarios, but they do bring to light the need of customization at the local level, the potential and proof of scaling mechanisms and the effectiveness of Decentralized Renewable Energy in the long run. SDG7 is one that needs to be institutionalized in every aspect of the development, in order to meet all the 17 goals in a sustainable and long term manner.

A solar powered stoneware unit in Karnataka, India

**To collaborate, or for more information reach out to us**

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**SELCO** Foundation

www.selcofoundation.org


A tailor, using a solar powered sewing machine in Assam, India