



# Sustainable Energy and Financing for Livelihoods in Jharkhand

## Case Studies



# **Solar Powered Rope Making for a Particularly Vulnerable Tribal Group (PVTG) - Birhor Tribe in Khunti, Jharkhand**

## **BACKGROUND**

Birhor means people native to the jungle ('bir' means jungle and 'hor' means men). The Birhor community is traditionally a nomadic community found mainly in Jharkhand, Odisha, Chhattisgarh and West Bengal. The Birhor tribe have been categorised as Particularly Vulnerable Tribal Group. They are a food considered as gatherers and hunters, thus their economic activities are deeply associated with forests.

One such activity is rope making, collecting the bauhinia creeper has been their major source of income. With dying forest cover now are making ropes with the cement plastic bags. The Birhor community of Jharkhand resides in very small clusters across 10 districts of Jharkhand. In Telengadhi village of Arki block of Khunti District fourteen families reside who practice rope making along with other forest based livelihoods.

The District Administration approached SELCO Foundation for a solar powered rope making solution for the Birhor. They took the responsibility of mobilising the community to demonstrate the technology with the help of Self Help Group members. SELCO Foundation organised training for the community and showcased the difference of manual and mechanised process of rope making. Ever since SELCO Foundation monitors and provides required inputs on their work on a regular basis.

## **PRE-INTERVENTION SCENARIO**

- Most women are involved with rope making here, the drudgery has led to health related issues among them.
- Manual process of rope making is time consuming and cannot be performed single handedly. High labour costs with poor production is a prominent challenge.

## **OWNERSHIP LINKAGES AND BUSINESS MODEL**

The solution is owned by 17 families within the village. They practice a serviced based community model. The rope making machine is installed at a common area within the village and is utilized by the women within these families only. A 30 feet rope is sold for INR 150 , with a production cost of INR 50. In a day the women make 1-2 ropes per day. They also make ropes used for levelistock which are priced at INR 20-30 per pair. The ropes are sold by the community at the local bazaar and to middlemen who come by frequently.

## **TECHNOLOGICAL SOLUTION**

The solution adopted is a solar powered rope making machine of 0.5 HP solution. With the help of a remote speed controller it can be utilised for 4 people at the same time.

## **FINANCIAL SOLUTION**

The rope making machine was contributed by SELCO Foundation for an amount of INR 90000 ( Machine cost being INR 30000 and INR 60000 for solar design).

## IMPACTS

- In Jharkhand, Khunti is the first district where solar powered rope making has been installed for the Birhor community.
- The usage of the solar powered rope making has reduced the drudgery, especially for the women.
- Manually they used to make 1-2 plastic ropes (30 feet) in a day. But now with the solar powered rope making machine, they are able to make 6-8 Plastics ropes (30 feet) in a day.
- The income has doubled due to increased productivity for the women within the community.



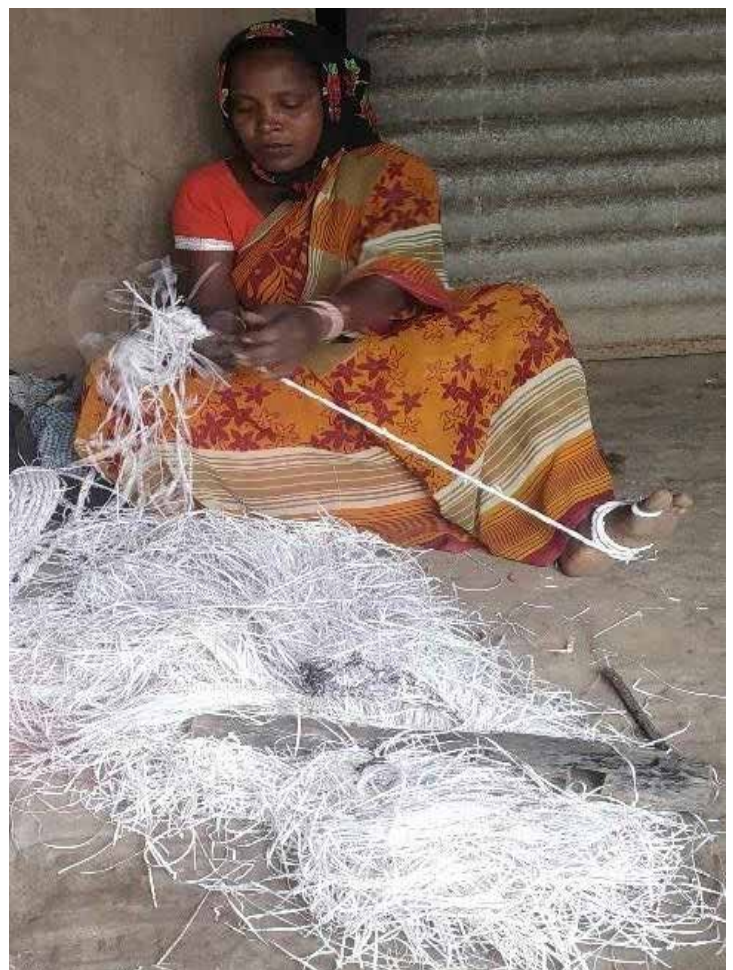
## COVID - 19

During lockdown the Birhor community of Telengadi village was unable to purchase the raw materials (plastic bags) and carry out their production. With the support of SELCO Foundation and Manju Devi, Secretary of Women Self Help Group, they managed to procure plastic bags from the District Administration, Khunti. Most of the rope during this period was sold locally in the region.

## WAY FORWARD

Using this case as a testimony further to implement a solar powered rope making solution with the Birhor's in Gumla. The proposal has been submitted to the National Bank for Agriculture and Rural Development (NABARD) to leverage funds from the "Tribal Development Fund" scheme.

This solution could be scaled through the Tribal Welfare Department of 10 districts in Jharkhand.



# **Solar powered Rice Processing with Mahila Kisan Sashaktikaran Pariyojna in Laterhar, Jharkhand**

## **BACKGROUND**

Majority of rural households in Jharkhand depends on agriculture and allied sectors for their livelihood, but the contribution of these sectors to household income is limited. Jharkhand is a tribal dominant state where women are much more active than men and a major contributor to the rural economy. Life Education and Development Support (LEADS) is an organization based in Jharkhand that works in the districts of Khunti, Hazaribagh, Laterhar, Ghumla etc to promote livelihoods of communities. LEADS has partnered with Jharkhand State Livelihood Promotion Society (JSLPS) for Mahila Kisan Sashaktikaran Pariyojna to empower women farmers in agriculture by making systematic investments to enhance their participation and productivity, as also create and sustain post harvesting agriculture based livelihoods of rural women. LEADS focuses on agriculture and natural resource promotion, animal husbandry for sustainable livelihoods and more. They have members grouped in SHGs across the districts, some of which are driven by women participation and leadership. In Laterhar and Ghumla districts alone, they have 1600 members who practice rice cultivation. These farmers live in very remote forested regions and are predominantly belonging to tribal communities.

## **PRE-INTERVENTION SCENARIO**

The district of Laterhar alone has 1600 farmers who practice rice cultivation. They grow a local indigenous high quality variety of paddy called Jeera Phool (aromatic paddy) which is unique to the region and has a high market value. Earlier in Laterhar, there was no decentralized rice milling solution or service available. People had to travel over 10 kms to a centralized mill to get their produce milled. Adopting this decentralized approach, the SHG members could provide milling services within their vicinity locally.

Jharkhand State Livelihood Promotion Society (JSLPS) is the State body of the National Rural Livelihood Mission and runs a program called Mahila Kisan Sashaktikaran Pariyojana (MKSP) which promotes agro-processing, NTFPs etc through women farmers. LEADS was on-boarded by JSLPS for implementing MKSP projects in Laterhar district. SELCO Foundation was directed to LEADS to support them with providing the right solar powered agro-processing solution as the previous solutions tried by the SHGs had failed due to poor power quality. Laterhar has single phase connections as a result of which is a very poor quality of power where even bulbs also don't function properly.

## **OWNERSHIP LINKAGES AND BUSINESS MODEL**

Ma Durga Swayam Sahayta Samooh an SHG Promoted by LEADS is a 20 women member group who decided to take up the decentralized solar powered rice mill solution, as they observed the need for hulling of rice and polishing within the community.

A small building infrastructure was set up with the help of the Jharkhand Livelihood Mission and the equipment, energy components were provided by SELCO Foundation in May, 2019. Multiple training sessions were conducted by SELCO Foundation staff for the women members. The women operate the machines, handle packaging, accounts, registers, maintenance etc. The decentralized mill is being run as a service model where they sell their produce through 4 middlemen who they have developed linkages with. Due to not having their own transportation, they sell to the middle men who come regularly and pick up the milled produce as well as paddy from the farmers. The middle men take the produce to markets in nearby towns like Daltonganj.

## TECHNOLOGICAL SOLUTION

The solar powered rice milling solution is a 0.5 HP machine which has two separate components; a huller and a polisher. The huller processes 60 kgs per hour and the polisher processes 50 kgs per hour. With the machines running for 6 hours, they can mill 3 quintals of produce per day.

## FINANCIAL SOLUTION

The working capital and polisher was funded by MKSP. SELCO Foundation contributed and funded the solar component and the rice huller.

## TRAINING AND CAPACITY BUILDING

Multiple training sessions were conducted by SELCO Foundation staff, for the women SHG members. The women operate the machines, handle packaging, accounts, registers, maintenance etc.



## IMPACTS

- **Income and profit:** Even during the lockdown, due to the unit being located in a remote region, the SHG members remained unaffected and were allowed to operate through it. This brought in more customers, increasing their income and turning in profits.
- **Additional customer base:** Due to the mills in the town being shut down as a result of the lockdown, people from nearby villages and towns started to use this service to mill their produce. At least 100 people recently who have accessed the mill have expressed to the SHG members that they will only come to their centre henceforth even post lockdown as it is more economical, convenient and time saving.
- **Food security:** Farmers and communities from nearby villages and from Kurokala have been able to process their stored paddy to rice which is giving them food security in a time where access to essentials has been difficult.
- **Awareness on solar:** A lot of the visiting communities are seeing solar energy for the first time and have learnt of its existence, uses and applications beyond just lighting.
- **Combatting energy issues:** The remote region suffers a lot of power cuts, frequent load shedding and voltage dips which would have required the SHG to rely on diesel, if it weren't for solar. It takes 2 days to procure a batch of diesel and in the time of lockdown, it would have taken longer with additional permissions required to be able to access it, causing hindrances in their service.
- **Need for an integrated model:** Due to increased orders which will continue post the lockdown, the SHG requires a higher capacity machine which can process 6 quintals per day. A preferred solution would be an integrated model with the huller and polisher in the same unit. SELCO Foundation will provide the solution to the SHG post the lockdown period.

# **Poultry lighting for Jharkhand Women's SELF-Supporting Poultry Co-Operative Federation LTD in Gumla, Jharkhand**

## **BACKGROUND**

Jharkhand has a poultry population of 18.10 million making poultry rearing a prominent livelihood in Jharkhand. The majority of farmers in rural areas of Jharkhand rely on rain-fed agriculture. This has led to food insecurity due to the low agricultural output. Hence, investments in back yard poultry farming can generate income and contribute to increased food and nutrition security. 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.

Poultry rearing being the common practice among households where broiler farming is carried out to rear chicken for their meat. Day old chicks are purchased and then usually kept for a period of 6 weeks until they reach 1.5 to 2 kgs, after which they are sold to markets. A small scale farmer on an average owns about 400-600 chickens and could rear 6 batches per year. With meager savings and earnings farmers find it extremely challenging to finance solutions. Financing a minimum flock size of 400 birds is a challenge, as input costs are high. This case study highlights the importance of how capital financing is a much required boost for farmers with no capital. Hence, the most pragmatic way to finance solutions comes through cooperatives and other collectivities where often input costs are subsidised.

Such is, 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. Gumla Cooperative society is one such organization that works with JWSPFL. The cooperative works with 800 women poultry farmers who were identified by JWSPFL and further connected to SELCO Foundation to enhance livelihood outcomes through technological interventions for these poultry farmers.

## **PRE-INTERVENTION SCENARIO**

- 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. With a net profit of INR 3000, it totally generates INR 18000 per year.
- The rearing cycles go up to 50 days to rear one batch of chicken.
- Most farmers are located in rural remote areas with poor electrification with frequent power cuts.

## **TECHNOLOGICAL SOLUTION**

Solar powered lighting solutions were implemented across 55 individual farms, The farms hold 400- 600 chickens per batch. The renewable energy lighting solution aims to keep chicks awake to feed and which influence the chicken weight. Poultry lighting is directly proportional to the FCR of chickens.

Based on the size and capacity of the poultry farm (which can range from 300 birds to 2000 birds), 5 watt, white LED solar powered lights are installed in the farms for every 200 sq. feet.

## **FINANCIAL SOLUTION**

The finances were met through bank loans and funds from revolving funds of SHGs, some of the end users are able to leverage funds from the Aspirational District Programme. The total cost of the lighting solution is INR 15000. The end users contributed INR 7500 and the rest was contributed by SELCO Foundation.

## OWNERSHIP LINKAGES AND BUSINESS MODEL

The federation operates on a service based community model. The federation acts as an aggregator of chickens for various cooperatives under it. The federation pays INR 6 to INR 7 per kilogram to the farmers. This is determined by the efficiency index (it's assessment of live rate, bodyweight, feed conversion ratio and duration of the chicken reared). Based on the efficiency rate, individual farmers are remunerated. This shields them of the market speculation and fluctuations.

The federation then sells the chicken within Gumla's local mandi. The surplus is sold off to markets in Chhattisgarh and Odisha. Mostly sold for wholesale between INR 75- INR 85 per kilogram. The federation also owns six retail outlets, where 200-300 kilograms of chicken are sold everyday generating an income of INR 40000 per store.

Each cooperative purchases the feed, chicks and other required material for the broiler poultry batch (400-600 nos.) for the farmers by their fund. The cooperative takes the loan from different sources – NABKISAN , Samunnati , other formal institutions like banks for the procurement of the materials required for the broiler poultry batches. Each farmer can take up 5-6 batches of poultry farming in a year. The cooperative shares the profit into two levels for each batch – cooperative earns INR 6000 – INR 7000 per batch and the farmer earns INR 3500-INR 4000 per batch. The cooperative has decided to provide the loan for solar powered poultry lighting with some contribution from the poultry farmer. They have fixed at least INR 300-INR 350 as an energy monthly instalment for the solar powered poultry lighting.

## IMPACTS

- Lighting increases rearing efficiency and brings down the days of rearing. The bird attains the desired weight of 1.5 kilograms within 35 days with the application of poultry lighting. Thus reducing the rearing cycle from before.
- Solar powered lighting solutions have cut the reliance on grid electricity.

## COVID - 19

With the outbreak of COVID-19 a lot of rumours fed into common belief that chickens could be a carrier of the virus. Due to which the consumption of chicken cut down drastically. Retail chicken was sold at a price of INR 80 per kilogram before and through the course of the lockdown was being sold at INR 10 per kilogram.

The months from January to June are considered locally to be the high consumption months due to the festivities and other social events. What might have been months of increased earnings turned out to be huge losses for the federation and farmers. Farmers who reared previously 6 batches a year now would rear only 4 batches in the year.

The federation was forced to dispose of 3 lakh chickens and sold 5 lakh hatching eggs for INR 2- INR 3 when they were previously sold for INR 25- INR 30. Overall caused them a significant loss over the course of 3 months.



## **Vaccine Storage Owned by a Self Help Group in Lohardaga, Jharkhand**

### **BACKGROUND**

PRADAN, a non-profit organization, promotes agriculture based and allied livelihoods, as they work in rain fed regions which are not particularly high yielding at Jharkhand. They work across all blocks of Lohardaga, Jharkhand. PRADAN had decided to target 2000 households of 5 panchayats spread across 6 kilometers to implement solutions for livestock vaccination. The targeted group were small scale farmers who are reliant on the livestock as their primary source of income.

Additionally, PRADAN has started deworming initiatives and has started building capacities of para-vets (Pashu Sakhi) through the Animal Husbandry Department and Jharkhand State Livelihood Promotion Society.

### **PRE-INTERVENTION SCENARIO**

- Vaccination is a critical part for livestock. At present, the blocks do not have any cold storage facility to timely administer vaccinations to livestock. Most of the households are dependent on the Animal Husbandry Department. Funds allocated to the Animal Husbandry Department are meager due to which vaccinations are not administered regularly and even when they do the potency of the vaccination is questionable due to poor quality of storage of vaccinations from source to destination. Due to this most households sell their goats at a very early age, at a lesser price. A fully grown, healthy goat could be sold for INR 4000- INR 5000, instead farmers sell them young for INR 2000- INR 3000.
- The mortality rate becomes higher during the rainy season. In the last year, 10% households have lost their entire livestock. It was reported that among goats, the mortality was at 30-40% for 0-3 months old goats and 20-25% in

### **OWNERSHIP LINKAGES AND BUSINESS MODEL**

PRADAN identified a SHG who would own the vaccine storage solution along with a paravet who could administer vaccinations to the livestock. The vaccine storage is kept at the middle of the 20 villages and maximum paravet has to travel 6 Km. The solution is installed at the entrepreneur identified by the SHG who is liable to operate the solution, though the solution is owned by the SHG. The entrepreneur charges a margin of 15% on the revenue generated.

Vaccinations have been planned only for goats and chickens. Farmers will pay the service amount directly to the para vet (pashu sakhis). For goats the amount has been fixed at INR 8 per vaccination and vaccination for Poultry, has been fixed at INR 3 per vaccination.

Initially for goats, PPR vaccines are going to be administered. For poultry, Lasota for Newcastle Disease and Fowl Pox Vaccine will be stored at the cold storage facility. Other than these, deworming will be done on a regular basis for both goat and poultry.



## TECHNOLOGICAL SOLUTION

The vaccine storage solution with a capacity of 46 liters. It's a unique technology that guarantees optimal cooling of vaccines between 2 to 8 degrees with no risk of freezing and a hold over time of 8+ days, this vaccine refrigerator needs only 2.5 hours of power per day to operate. It has a digital temperature display as well as internal temperature control for better energy management.

## FINANCIAL SOLUTION

PRADAN financed the procurement of the vaccines and medicines for INR.60000 and SELCO Foundation contributed towards the infrastructure cost for the vaccine refrigerator, INR 234000, to cater the livestock rearing families in the Badki Chapni block.

## IMPACT

After having installed the vaccine storage, as per the Village Organisation and PRADAN baseline the mortality rate has been reduced to 70 % with improved savings of INR 35000- INR 45000 annually.



## WAY FORWARD

This case study could be used as a testimonial and is to be shared with Jharkhand State Livelihood Promotion Society (JSLPS), NABARD and Animal Husbandry Department so that it could be replicated in other areas of Jharkhand & Odisha.



## **Solar Powered Cold Storage with Murhu Nari Shakti Kisan Producer Company Ltd. in Murhu, Khunti, Jharkhand**

### **BACKGROUND**

A Farmer Producer Company named Murhu Nari Shakti Kisan Producer Company was identified through CInI who were in need of a cold storage facility for storing the local produce of farmers in the region. Further CInI reached out to SELCO Foundation to address the technological needs of the FPC. The role of CInI and SELCO Foundation is to monitor the FPC activities and help them in setting up cold storage solutions along with developing a viable business model.

Murhu Nari Shakti Kisan Producer Company has 41 registered members and has almost 400 farmers associated with them. The farmers belong to either tribal communities or OBC communities. Their major source of income is cultivation of vegetable cultivation, through rabi (October to March), kharif (July to October) and summer season.

In the region of Murhu farmers grow (across 10 villages) 40 MT of vegetables in each kharif and rabi season, these being the high yield seasons. During the summer season, the production is not more than 5 MT due to unavailability of irrigation sources. The main produce grown across the year are; tomato, chili, watermelon, okra, beans, cauliflower, cabbage, green peas, bitter gourd and pointed gourd.

### **PRE-INTERVENTION SCENARIO**

Most of the time, they have to sell their produce at a lower rate than production cost during kharif and rabi which are the high yield seasons. The farmers sell their produce directly to the local vendors and miss out on profits due to middlemen.

### **TECHNOLOGICAL SOLUTION**

The cold storage solution is a 5MT Ecofrost solution. The cold storage solution caters to the need of multiple crop cooling needs.

### **FINANCIAL SOLUTION**

The solution has been procured on a rental model, and the rent amount was contributed by SELCO Foundation INR 400000. And further its planned to procure the solution for which a loan is in the process of being availed with SBI bank with a 35% subsidy. The total solution cost is INR 1,600,000.

### **OWNERSHIP LINKAGES AND BUSINESS MODEL**

The solution is currently managed and operated by the FPC on a community based service model. The FPC has procured the solution on a rental model from Ecofrost. The rental model will aid the FPC to evolve the business model and to test the technology for the multiple vegetables. They would operate the unit and have fixed service charges for keeping the vegetable in cold storage (at least inr 2 per Kg for a cycle of 2 -8 days) and cater to the needs of the farmers associated with the FPC.

The long-term plan of FPCs is to procure vegetables from the farmers and store them in the cold room and sell in the market directly. They are also planning to target non member farmers and act as an aggregator of produce in the region.



## IMPACT

There is an incremental increase of farmer incomes. Farmers are now able to store their produce for longer periods and sell when the market fetches them a better price. And the reliance of middlemen is beginning to reduce.

## WAY FORWARD

The model would be further shared with NABARD, JSLPS, OREDA, Horticulture Department and other Partners (Tribal Research Institute) and bankers so that it could be replicated in other areas of Jharkhand.



## **Solar Powered Dal and Flour mill with a Self Help Group in Ramgarh, Jharkhand**

### **BACKGROUND**

Jharkhand has the second-highest poverty rate in the country. Despite having the largest share of the country's mineral resources and impressive economic performance during the 12th Five Year Plan (2012–17), poverty incidence in Jharkhand remains at 37 percent. A majority of rural households depend on agriculture and allied sectors for their livelihood, but the contribution of these sectors to household income is limited. Jharkhand is a tribal dominant state where women are much more active than men and a major contributor to the rural economy.

SUPPORT (Society for Upliftment of People with People's Organization and Rural Technology) is one of the pioneering non-profit non-governmental organizations in the state of Jharkhand. The idea behind the establishment of organization is to nurture community by using the most effective and dynamic technology and skill. SUPPORT strongly believes on the democratic process of development where all strata of people, mainly poor and marginal households can contribute their imperative role in every sphere of development and utilize the local resources to improve the lives of individual and community at large. At present, the organization is working in Hazaribagh, Khunti, Garhwa, Chatra, Koderma, Giridih, Dumka, Ramgarh and Bokaro districts) within the state of Jharkhand. SUPPORT has partnered with Jharkhand State Livelihood Promotion Society (JSLPS) for Mahila Kisan Sashaktikaran Pariyojna to empower women farmers in agriculture by making systematic investments to enhance their participation and productivity, as also create and sustain post harvesting agriculture based livelihoods of rural women. Within the livelihoods work, LEADS focus on agriculture and natural resource promotion, animal husbandry for sustainable livelihoods and more.

### **PRE-INTERVENTION SCENARIO**

- The dal processing unit caters more than 500 households, but dal being a seasonal crop which meant that unit was utilized for only 6 months through the year and was redundant for the remaining time. Also, a system of 3.5KW was left under utilised along with erratic power cuts. So, after interaction with the SHG, SELCO Foundation suggested adding a flour mill with the existing solar system for value addition and utilization. The area has huge potential of wheat and the villagers have to travel 20-25 kilometers for the grinding of wheat. So, they decided to start a wheat processing unit along with the Dal processing unit. They have decided to go for a service model and the people eat wheat chapati throughout the year in that area.
- The net profit of the dal processing unit was at INR 2310 per month, with 50 kilograms processing per day for 22 days a month.

## OWNERSHIP LINKAGES AND BUSINESS MODEL

Durga Mahila Vikas Support Sangh, Jobla has set up a Dal Processing unit in Jobla, Mandu, Ramgarh, Jharkhand. The processing unit has been set up under Mahila Kisan Shaktikaran Pariyojana, Jharkhand State Livelihood Promotion Society. The Sangh includes 2 SHGs with 20 members. The women members are managing the processing unit and involved in following activities; procurement of red gram (Arhar seed) from different villages ( 40 villages), maintaining stock and grading of red gram and processing of the dal and flour. On an average daily 50 kilograms are processed and sold at INR 20 per kilogram. The processing charges is INR 2 for members and INR 3 for non-members.

SUPPORT has appointed one marketing personnel for retail sales. On an average retail seales is 15 kilograms per day priced at INR 95 of per kilogram for flour and dal.

## TECHNOLOGICAL SOLUTION

The solution adopted are; a dal mill of 1.5 HP and a flour mill of 2HP which was accommodated with the same solar system as used for the dal mill at first.

## FINANCIAL SOLUTION

The SHG members got the support of setting up a Solar Powered Dal mill from MKSP and UNDP. The SELCO Foundation has helped and set up the flour mill with the existing solar system.

## IMPACTS

- Increased profits: With the integration of the flour mill with the dal mill has maximised the productive usage of the system. The processing quantities are being met year around now. Additionally with the retail sales, the unit now makes a net profit of INR 53900 per month.
- Awareness on solar: Nearby communities are witnessing the usage of solar energy for the first time and have learnt of its existence, uses and applications beyond just lighting.
- Combatting energy issues: The remote region suffers from frequent power cuts and voltage fluctuations which meant relying on diesel. With solar the unit is able to function uninterruptedly throughout the day.
- Model for replication: SUPPORT has replicated a similar model in Hazaribagh district. They have installed rice huller, dal and flour mills in the common solar system.





Keep in touch with us

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