

Vaccination Chamber: An assurance for better livestock health

Chanaro is a Village located in Churchu Block in Hazaribagh District of Jharkhand State, India. This village is actively involved in Lakhpati Kisan Program and has emerged as a prominent example on impact of vaccination chambers and carriers. The Livestock Service Providers (LSPs) Durgesh Kumar Singh, Parasnath Mahato, Sujan Lal Soren, Naresh Patel, Rajesh Kr. Mahato were the initial individuals informed about the program. They subsequently conducted a comprehensive household survey to determine the number of goat and pig farmers in the area.

The need for this intervention was seen due to the rising need for vaccines in the livestock program. The Livestock resource persons used to store the vaccines in a fridge kept in the office at Churchu. But due to regular power cuts and high temperature of Jharkhand, medicines caused side effects. Moreover, one vial of vaccine cannot be recapped and had to be utilised completely. Since there was no proper medium of carrying the vials except ice boxes, the unsealed vials used to get spoiled.

The local support system was in form of a refrigerator having inverter support, but it could not provide sufficient backup due to heavy power cuts. Thus, the solar powered vaccination chamber was seen to be beneficial in combating the issue of continuous power supply. After using the office fridge for 5 years, the people switched to solar powered vaccination chambers and carriers.



Sujan Lal Soren, an engaged Livestock Service Provider (LSP) from Chanaro village, describes his involvement and personal experience, stating, *“Initially, my training focused on livestock management. However, challenges arose due to frequent power cuts and the considerable distance between the villages, which made it difficult to administer vaccinations. The medications required refrigeration, and the lack of reliable electricity posed a problem. In 2021, when the solar chambers and carriers was introduced, I eagerly joined the program. Today, we no longer have to rely on electricity and the carriers enable us to store the unsealed vials without the risk of spoilage.”*

The rate of vaccination per goat or pig is Rs. 10. Sujan Lal visits 550 families and vaccinates approximately 700-800 goats and 70-80 pigs. His income from vaccination has increased to Rs. 10,000 from Rs. 3,000-4,000 keeping in account that vaccination drive takes place once in every 6 months.

The vaccination chamber operates on solar and hence runs for 24 hours without disturbance while the carrier gives a backup of 15 to 16 hours after every charge. This has helped in achieving a major impact as the ice boxes used earlier could only provide a backup of 2 to 2.5 hours due to which the vials used get spoiled. Now even though only one vial gets opened at a time, the vaccination carrier prevents the spoilage up to a great extent.

Use of Excess Energy

The off-grid solar pumps are replacements of diesel pumps, leading to a decrease in labour and an increase in the irrigational area. While in certain geographies access to clean energy solutions have been achieved, with villages having 2 to 5 solar pumps installed in close proximity. However, despite this significant expansion in irrigated land, solar pumps installed in tribal areas remains underutilized, resulting in the potential of energy generated by solar PVs being wasted.

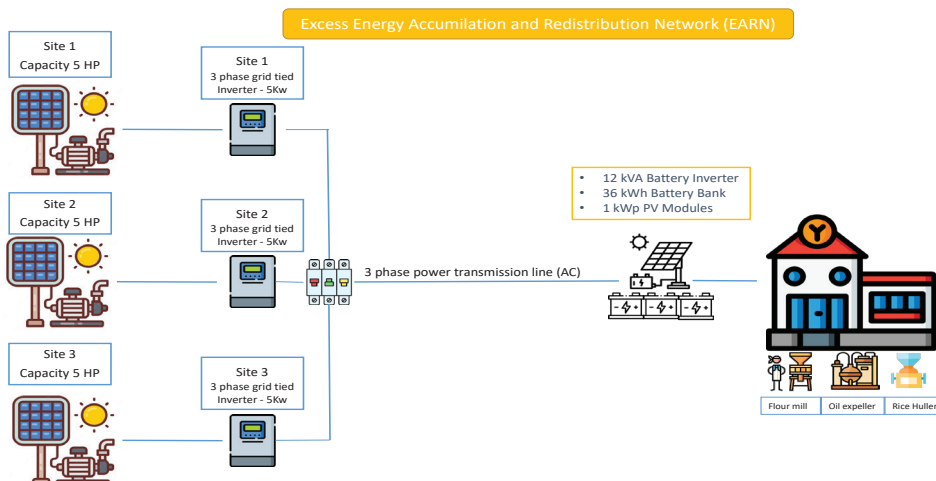


A standard 5 KW solar panel bears the capacity to generate 7,000 kWh energy, but only 50-60% of this energy is currently being utilized. On an average, a 5 hp solar pump runs for 900-1,000 hours annually and with almost no usage in monsoon seasons and partial usage in winter and summer. Consequently, there is an additional 3,500 kWh of energy which can be harnessed.

In order to address this issue, work is initiated across 15 locations within Jharkhand. Two of them being Saridkhel in Khunti and Derang village of Torpa, both in Khunti district of Jharkhand. The basic idea behind the intervention is to provide rural-end consumers with a reliable supply of power while making sure it is affordable for people who are even at the lowest echelon of the society.

As one of the cases shows, Jai Singh is a small farmer in Derang village of Torpa block in Khunti. He is an entrepreneur and runs a 3 HP rice huller with the help of his 5 HP pump (5 kWp) and serves 45-50 HHs from the hamlet. He runs the mill

from 9 am to 3 pm and provides service for 6-7 households and produces approximately 80 kg rice per day @ Rs. 14 per tin. "I run the mill during sunshine hours when the pump is not in use. People generally bring paddy in jute bags but I sell it back in tins so that I know the weight that is being sold. It has been one year since I am running the machine." says Jai Singh.



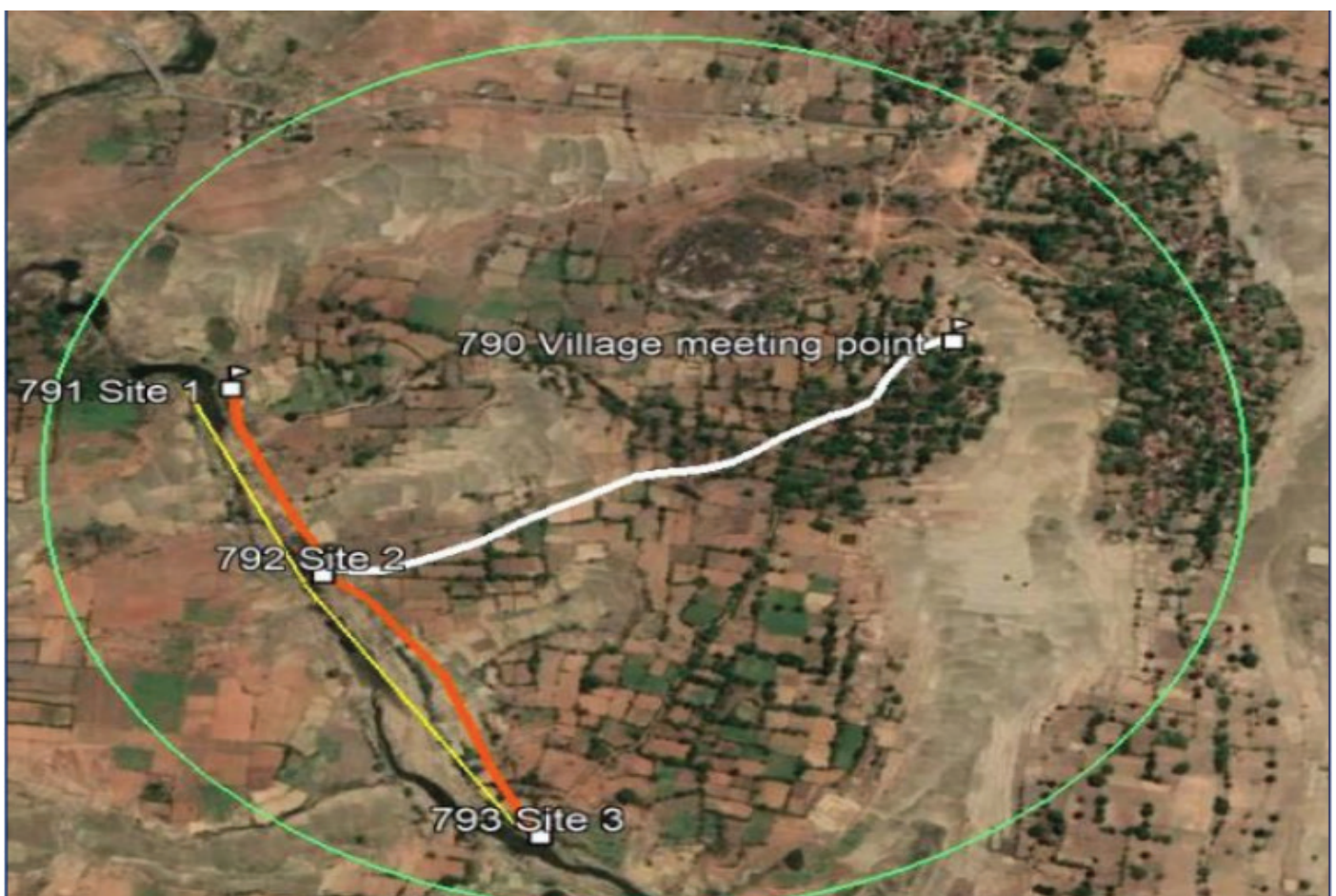
He also sells husks obtained as by product of hulling @ Rs. 4 per kg and every tin produces 1 to 1.5 kg. He has earned around Rs. 10,000 to 12,000 in last year from his rice mill.

Jai singh not only is irrigating 5 acres of land in two seasons but also using the ideal time in running a productive load which benefits the entire hamlet of his.

With the support of PRADAN, a modified version of the above-mentioned extension model has been developed for Saridkel with the only difference being that the pumps are arranged in a group-based model. In this village, six solar pumps were installed in the village. However, it was observed that the pumps did not operate regularly, resulting the energy being unutilised. Additionally, it was also noted that the farmers had to spend approximately 8 to 10 hours per month travelling to flour mills and oil mills located 15-20 km away from the village. By deploying these mills locally, the time and effort wasted in travelling could be saved, bringing benefits at community level.

For this intervention, around 3 pumps will be used in a cluster. These pumps will trade energy between themselves to run productive appliances. A productive load unit of maximum 7.5 kW has been set up in these villages which consists of a rice mill, flour mill and oil expeller that runs on the energy drawn from the solar pumps. The entrepreneurs of the production unit pay a fixed charge for the energy being utilised to the water user group.

The above two cases provide an important lead into optimal utilization of solar PV. The story can be replicated across 1000s of pump getting deployed by various government schemes and NGOs.



DRE as a business potential: A case of Gharonj Lahanti Mahila Utpadak Farmer Producer Company



Gurabanda is a tribal dominated block of East Singhbhum district carved out from Behragora and Dhalbhumgarh block in 2010. Despite all households having electricity access, a third of it experience poor quality of service. On an average a household have an access to only 8 to 10 hours of supply per day. As a result, very low percent of electricity consumers indicated that they were satisfied with their grid connection.

Gharonj Lahanti Mahila Utpadak Producer Company Limited (GLMUPCL) is an FPO, promoted by TSRD (Tagore Society for Rural Development) and CInI-Tata Trust (Collectives for Integrated Livelihood Initiatives). As of 2021; 1336 members are registered Shareholders under Gharonj Lahanti FPC. The main objective of this FPC is to do collective marketing of farmer's produce. Seeing the potential to do contribute in the energy space, the FPC have collaborated with Selco Foundation and Sustain plus in order to provide solar energy solutions.

As energy is a major challenge in rural areas of Gurabanda and in adjacent blocks, renewable energy was seen as a promising solution to this problem. Since availability, installation & maintenance of solar powered equipment in rural areas are very unsatisfactory, Gharonj Lahanti saw the energy crisis as an opportunity to build a market with doorstep services.

The FPC has now doubled up its capacity and has established itself as an energy enterprise that has been providing solar based solutions across the areas of Gurabanda and beyond. This is the first-of-its kind initiative in the district as well within the state. The operations are conducted in two phases namely: demonstration phase and operational phase. The selected solar products are first demonstrated in Gurabandha Block before beginning the full-fledged operations. After successful demonstration, the members of FPC start exploring the new demands of the product.

The FPC offers a range of services that include solar lighting systems, solar powered elephant repellents, sewing machines, tree pruners, vaccine refrigerators with a capacity of 50 litres, solar rice mills and solar fencing. Additionally, Gharonj demonstrated solar-based egg hatcheries and solar-based hand sanitizer machine. The solutions have been

provided to notable institutions like Saint Joshaf Hospital (Jamshedpur), Jharkhand poultry federation etc.

As of June 2023, the FPC's efforts have resulted in the installation of a total of 80 home lighting systems, 345 poultry lighting systems, 14 solar fencing and 34 solar pumps. In terms of financial performance, during the fiscal year of 2022-23, the FPC generated a total income of INR 44,39,000 from solar pumps and fencing, with a profit of Rs. 2,19,000. From 2018 to June 2023, the overall business revenue amounted to Rs. 5.92 crores, out of which Rs. 1.13 crores were generated from the solar business. **This solar business accounts for 19% of the total balance sheet of the FPC.**

Looking ahead, the FPC has strategic plans to establish a solar-powered cold storage facility in Gurabandha block with a capacity of 5 MT specifically for storing vegetables. Additionally, they aim to expand their home lighting solutions to reach 500 households. For further growth, the FPC is developing plans to scale up solar-based sewing machine models, vaccine refrigerators, and egg hatcheries. These plans involve studying the successes and limitations of these projects to ensure effective implementation.



Transformation of youth (Solar MLI)

Kalipurranga village is located in Jama subdivision of Dumka district in Jharkhand with 88 HHs and a total population of 403 people. Jama is the nearest town to the village for all major economic activities.

The village has one 5 Hp solar pump under Sustain Plus project with 32 households are in water user group. This WUG is mainly comprised of young girls of 20 years and above. The farmers used to grow Arhar, Kulti and Maize, as these crops can resist water scarcity. In 2021, the 5 hp solar irrigation structure with buried pipelines was installed costing around INR 6.5 lakhs. 30% of this cost was contributed by the farmers.

It has been observed that solar irrigation has greatly impacted drudgery as people do not need to carry the pumps along with them. Besides, the long drive to reach nearby diesel pump is completely removed.



“We could only cultivate 1 acre of land with a diesel pump. Solar has proven to be a boon in disguise where investment is only once but returns are long term and also high. We now cultivate 15 acres of land with chilli, tomato, brinjal, pea and mustard. The best part is all these crops requires water. Had this been suggested to us with a diesel solution, we could not have even thought of cultivating these crops.” says Pakhi Murmu.

Farmers can now cultivate 36 kg of crops weekly and earn up to Rs. 40,000 – 50,000 per head in one season from 15 acres land. From an annual income of INR 50,000, the village has grown to an income range of INR 50,000 to 1,00,000. Their future plan includes better agriculture practices, insurance for livestock, vaccination training, lac cultivation, cattle rearing and poultry farming.

All 32 families associated with the solar program in the village used to migrate for labour work which now stands zero as they feel a sense of income and job security with farming in all three seasons.

Meena Besra, a 21 years old student of B.Sc. Chemistry is a part of Akhil Marshal Aajivika Sakhi Mandal Asur Meeru WUG. She lives in a family of five and used to cultivate only 20 decimals of land. “I needed tuition but did not have the money and also faced a huge problem in paying my college fees. After signing up for the solar project we slowly started to cultivate in all three seasons and now our cultivation has increased from 20 decimals to 70 decimals.” says Meena happily. She goes on to share her dreams *“Right now I am studying in college, able to pay my fees, get myself tuition and work hard in the fields. We purchased two bikes from our savings and earlier we barely made Rs. 50000 but now we can earn up to Rs. 100000 and sometimes even more in one season.”*

There are many other young girls in the WUG like Meena who are working hard towards their dreams and trying to achieve them through agriculture practices.

According to Mr. Gautam, team member from PRAVAH organisation, “Ever since Kalipurranga patch developed, migration has reduced to zero; people are encouraged to do high value agriculture.

Lac Cultivation: A green enterprise, powered by green energy

Village Roro is around 22 Km away from district headquarters of Khunti where majority of the families are small and marginal farmers. Lac Cultivation forms the secondary source of income and a fallback mechanism. Around 72% of households undertake lac production.

The village houses 98 HHs in total of which only 63 HHs have access to solar powered lac pruners. The lac pruners are registered under one entrepreneur in village and is operated on a rental basis. The rent collected is reported to the producer group named Juniel Utpadak Mahila Samuha Roro.



Kripa Purty, a young lac farmer, recounts her experience in lac cultivation, stating, *“Initially, I had 10 Jujube (Ber) trees and 2 Kusum trees dedicated to Lac production. For the inoculation process, I would use 5 kg of brooding material for Jujube trees and 3 kgs for Kusumi trees. However, due to the manual pruning required, I could only manage to prune one tree per day as it was physically exhausting. Unfortunately, this often led to accidents and injuries.”*

Kripa Didi got to know about the solar pruner from SHG meetings and was excited to know that her drudgery could be reduced with the help of solar pruner. *“When I first came to know I did not believe. Then Anil dada from NBJK took us to Churchu and showed us the technology. Now it hardly takes 40 minutes to prune one tree. It has not only saved time but has also reduced the risk of accidents as I do not have to climb trees anymore.”*

The rent for per day usage of the solar pruner is Rs. 50 which is deposited in the Producer Group Account. Till date the group has collected Rs. 4800 as rent from the pruner after meeting repair and maintenance expenses. The farmers like Kripa Didi say that the new technology saves time and has eased cutting of branches.

Earlier it used to take around 2 to 2.5 hours to prune one tree but now for smaller trees it takes only 20 mins while tall trees take ½ an hour to get completely pruned.

This has greatly impacted their income.

The average income of the farmers used to

range between INR 35,000 to 40,000 before solar intervention which has now increased to INR 60,000 to 85,000.



Influenced to change Solar MLI

Nalduha is a small village situated in Kokpara Panchayat within the Dhalbhumgarh block, primarily consisting of paddy farmers. The village is home to a total of 147 families, categorized as follows: 38 families belong to upper class including servicemen; 78 under middle class category, possessing more than 2.5 acres of land; and 31 families fall under lower class income range, with less than 1 acre of land, including wage labourers.

In 2020, the villagers were introduced to the concept of solar pumps. Prior to this, they only engaged in farming during the Kharif season. As water scarcity was a significant challenge, majority of them focused on paddy cultivation, with black gram and Arhar being the only other pulse crops grown during the season. Traditional diesel or electric pumps were not effective in addressing their water needs.



Shyam Charan Hansda was one of the first farmers to contribute to the project. His desperate need for irrigation water led him to contribute to the solar water pump. *“There was no water in our village. We only grew Paddy. Then dada came from RDA and told us about the solar water pump. We had already tried a lot of options for irrigation but nothing worked. So, I contributed INR 32000 as I wanted to try it along with 5 other farmers.”* says Shyam da.

This led to the installation of very first solar pump in the village and today the village has 6 solar water pumps with the first pump being installed in 2020 having 10 members in WUG from Badoligarh tola.

The villagers were trained for better agriculture technology by the RDA and CInI team before slowly shifting to vegetables cultivation. There are 32 households under the solar patch of Tirildih and 42 households under Badoligarh solar patch. The average landholding size of one farmer is minimum 1.5 to 2 acres including paddy area.



Shyam Charan’s family are traditional paddy growers with 15-16 bigha land divided among 3 brothers. Their family produces 100 Q of paddy. Prior to pandemic, the brothers earned an individual income of Rs. 50,000 to 80,000 from 35-36 Q produced on one field. With vegetable cultivation, their individual income has increased by Rs. 30,000 to 50,000.

Like Shyam da, many other farmers have transformed their lives with the help of DRE. The members of the WUG had contributed only 10% of the total cost of the system but looking at the flow of income, the new households are fine to contribute 25-30% of the asset cost.

From Waste to Energy- Story of Bio-Fertiliser



Cattle dung plays a vital role in rural economy. Efficient use of livestock resources in biogas systems can help generate localised clean cooking energy for rural masses. At the same time, slurry, a by-product of biogas plant is a potential source of major and micronutrients besides organic matter. Its proper utilisation after processing has a vast

potential in meeting the nutrient requirement of the crops besides providing sustenance to soil health.

The bio slurry processed from the cattle dung can be used to produce bio fertilizers which can meet the requirement of NPK and micronutrients (Fe, Mn, Zn, Cu) by about 4.5% and 0.4% respectively.

National Dairy Development Board and Sustain Plus Energy Foundation has established an end to end Manure Value Chain. The bio fertilisers developed from the bio slurry are branded as SuDhan products. Their use in agriculture has shown encouraging results with enhancement in the yield of different crops. ¹The use of such bio slurry-based bio fertilisers has huge potential to reduce expenditure of farmers on chemical fertilizers at the same time enhance their income through improved yield.

The slurry-based bio-fertilisers also known as Phosphate Rich Organic Manure (PROM), has been applied during the cultivation of 29 crops in different sites of Jharkhand by Medha Dairy. Although, complete results are yet to be evaluated and obtained from the field, the growth of crops have shown a significant difference with the application of PROM. Out of 29 crops, watermelon and sweet corn have undergone major impact.

Imran dada is a small farmer in Changani village of Bero block in Ranchi. He has a cultivable area of 0.4 acres which has been used for cultivation of watermelon. Out of 0.4 acres, 0.2 acres of land was treated with PROM, MRL and Root Guard. An equal land area was selected for controlled cultivation of non Su-Dhan watermelon.

¹ Independent studies conducted by Anand Agriculture University shows a yield increase of 20%



Imran dada says “The Sudhan products have helped in improving the growth and yield of watermelons. The plants are greener and flowering is also better. Whereas the land in which I applied fertilisers are not flowering the same way.”

The total production of Su-Dhan treated plot was 7000 kgs while the controlled area gave a production of 5,150 kgs. Thus, there has been an increase of 26.4% in Su-Dhan treated watermelons with a recorded difference of 1,850 kgs in yield between Su-Dhan crops and non Su-Dhan crops.



PHOSPHO Max
Manure Rich in Phosphorus

<p>उपयोग : फसल बुआई के समय 50-100किग्रा./एकड़ एवं बुआई के एक माह बाद 25-50 किग्रा./एकड़ की दर से उपयोग करें।</p>	<p>लाभ : मिट्टी में फास्फोरस निघरिण की समस्या को हल करता है। फास्फेटिक उर्वरक का प्रतिस्थापन</p>
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सावधानियाँ :
भंडारण शुष्क एवं हवादार स्थान पर करें। आँख के संपर्क में न लाएँ। बच्चों के पहुँच से दूर रखें। हुक का प्रयोग न करें।



Small Pumps, Larger benefits



Agriculture in Odisha is largely rainfed and vulnerable to climate variability and change. About 70% of the net sown area in the state is unirrigated and suffers from frequent droughts and floods. The lack of irrigation infrastructure and reliable electricity supply limits the use of conventional electric pumps for irrigation. As a result, farmers face water scarcity, low crop yields, and income insecurity.

Women farmers in Odisha like any other region face additional challenges due to gender inequality and social norms. Despite contributing a major share of work within agriculture, women continue to be deprived from access to technologies.

The Keonjhar and Mayurbhanj districts of Odisha have a uniqueness of numerous water bodies dotting around undulating hilly terrains. These water bodies largely remain untapped due to its distance from homestead lands, which usually have grid connections.

Sanahatnabeda is a small village in Kusumi block of Mayurbhanj district in Odisha. Unlike previous years, the fields of Sanahatnabeda was covered with green vegetables during the spring season. This is because, farmers like Srimati Hembram had cultivated bitter gourd and chilli.

Srimati Didi earns primarily from agriculture but due to lack of access to water around homestead, she used to depend completely on paddy cultivation and income from her son's migration. In Jan 2022, she got an access to solar portable pump and started cultivating vegetables in



spring and summer which was earlier not possible. She planted 800 saplings of bitter gourd and transplanted 600 saplings of chilli in the first batch followed by 400 saplings of tomato in July.

She has earned more than a lakh rupee from the above crops collectively and has now planned to construct a ring well and has planted 1000 saplings of bitter gourd.



“Solar pump is like a blessing for us. We don’t have to worry about rain or diesel and can now grow bitter gourd & chilli that fetch good prices in the market. It has made us more confident.” says Srimati didi

The key enabler here is the sub-HP solar pump which has been designed for surface water pumping, to cater to small farmers with land holding of less than 1 acre. The pumps being small in size are easy to carry and operate. Thus, portable solar water pumps have proven to be extremely beneficial for them.

The story of Srimati Devi is repeated by more than 750 farmers from across Jharkhand and Odisha.

