POWER FOR ALL FACT SHEET

Rural Agribusiness Opportunities and Applications in India

POWER FOR ALL

Productive use of energy (PUE) in India spans multiple applications. PUE solutions leveraging decentralized renewable energy (DRE) can provide cost-competitive alternatives to existing solutions through savings on fuel costs, efficiency and reliability. This fact sheet outlines some of the latest innovations in DRE-powered agricultural technologies and highlights their market potential in India.

As India's population gains access to electricity, its agricultural sector is challenged by grid reliability, appliance access and fuel cost barriers. DRE-based technologies might provide new opportunities.

- India remains a highly agricultural and rural country, with 65.5% of its population residing in rural areas, and 42% of the workforce and 16% of GDP value added depending on the agricultural sector.[1, 2]
- Despite its economic significance, India's agricultural sector suffers from problems of inefficiency and poor productivity, which have stagnated its growth, averaging at an annual rate of 2.88% between 2014–15 and 2018–19.[3]
- In India, about 52% of the cultivated land relies on seasonal rainfall. Post-harvest losses amount to approximately US$13 billion annually.[4, 5]
- Emerging DRE-powered agricultural technologies show promising potential for smallholder farmers to increase yield, save fuel costs, mitigate fuel cost fluctuation risks, prevent food loss and waste, prolong product shelf life, and add value through processing.[6]

US$13 BN

POST-HARVEST LOSS DUE TO INAPPROPRIATE STORAGE AND INEFFICIENT FARMING PRACTICE

US$9.4 BN

INDIA'S SWP MARKET POTENTIAL BY 2030

2%

PUBLIC AWARENESS OF SWP SUBSIDIES

Solar water pumps (SWPs) can provide new irrigation access to unirrigated lands and save costs for the 9 million pumps that run on diesel.

- Currently there are more than 180,000 SWPs in operation in India. Another 3.7 million farming households can benefit from irrigated farming, representing a market potential of US$9.4 billion by 2030.[7, 8]
- For the 30 million water pumps that are connected to either grid electricity or diesel, SWPs add more value by displacing diesel, and not as much by connecting to grid.[9] Therefore, SWP deployment strategy should target the farmlands that are further from the grid.
- The net present cost of a diesel pump – taking into account lifetime fuel costs – can be as high as US$8,000, compared to US$7,600 lifetime costs of a SWP without any subsidies. With appropriate subsidies, SWP's lifetime cost can be as low as US$4,600.[10]
- SWPs, when displacing diesel, can bring value to not only crop cultivation but also salt farming, which is often located in seasonal wetlands without grid access. Salt farmers can spend as much as 40% of their annual income on fuel for diesel pumps. Displacing these diesel pumps on salt farms brings an estimated market potential of US$150 million.[11]

Emerging technologies such as solar-powered tractors, solar drying, solar cold storage, and solar egg incubation have shown potential to displace diesel or back up unreliable grid connections.

- Farm mechanization can add up to 30% in agricultural productivity and increase farm income by an average of 39%. Solectrac, a solar-powered tractor model, has been developed jointly by the US and Indian authorities to meet the needs of smallholder farmers. It is 5 times more efficient than its diesel-powered counterpart.[12]
- Solar drying can significantly reduce post-harvest loss and prolong product shelf life. Small-scale model has emerged that costs as little as US$200, making it affordable for

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By the Numbers:

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smallholder farmers. Demand is high from certain cash crop value chains such as tea and spices.[13, 14]

» Inappropriate cold storage due to unreliable grid power poses challenges for rapidly perishable agricultural products. Innovative cold storage technology from Ecozen Solutions runs entirely on solar power and utilizes thermal technology, removing the need for batteries and providing back-up power for up to 36 hours. This allows farmers to store and sell their products at optimal market prices, increasing their profits by more than 40%.[15, 16]

» Egg incubation requires stable sources of heat. A solar incubator can maintain incubating conditions while drastically reducing electricity costs and problems related to grid reliability. A solar incubator offered by a Kochi, Kerala-based firm costs about US$650, with an expected payback period of less than 3 years and lifetime of 10 years.[17]

DRE-based agricultural technologies are at various stages of maturity and require different deployment strategies. India's experience in deploying SWP provides valuable insights for other emerging technologies in terms of policy, financing and consumer awareness.

» Since 2014, the Ministry of New and Renewable Energy (MNRE) has been promoting SWPs through a series of capital subsidy programmes. Adoption, however, has been slow and actual deployment falls under set goals of 1 million pumps by 2021–22.[18]

» Instead of a capital subsidy of 25%, spreading the subsidy across the loan term of SWP with an interest rate subsidy might be more cost effective for the government. Farmers' perception of an interest subvention scheme needs to be further investigated.[19]

» A survey in 2018 found that only 2% of the farmers are aware of the subsidy scheme for SWPs. Therefore, policy awareness is important to its success.[20]

Share the Message

» DRE-powered agricultural applications such as solar irrigation, solar salt farming, solar cold storage, solar drying and solar incubation can save costs, reduce loss, and increase yield for farmers.

» Deployment strategies of various DRE-powered agricultural technologies can learn from India's experience promoting SWPs.

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