

Field Insights on Grid-Connected Solar Scheme in Gujarat

Among the grid-connected solar pilots that have been executed in India, [Suryashakti Kisan Yojana](#) or the SKY scheme is the largest pilot program in the agricultural sector. SKY is a decentralized solar scheme promoted by the Government of Gujarat, mainly targeting farmers already connected to electric grids. Through SKY, it is aimed to provide quality daytime electricity to farmers, reduce the distributional losses and render an additional source of income to the farming community by selling excess energy. The program uses a net metering design, where electricity utilities purchase solar electricity from farmers at Rs. 3.5 per unit. Through SKY, 93 agricultural feeders have been solarized till now, which spreads across the state. Gujarat Urja Vikas Nigam Limited - a government holding electricity company, had taken responsibility for implementing SKY in coordination with electricity utilities.

In July 2021, IWMI researchers carried out a field visit to agricultural feeders in the Anand, Botad, Bharuch and Aravalli districts of Gujarat, where the SKY has been implemented. The visit's main objective was to gain field insights into the operational details of the SKY scheme. During the visit, discussions were held with both officials of electricity utilities and farmers to understand the perceptions about solar irrigation, experience with the SKY scheme, changes observed over time, challenges and possible thought-out solutions.

There are four electricity distribution utilities that serve specific areas in the state (see picture 1). During the field visit, the following agricultural feeders were covered served by various electricity distribution utilities:

- Ishnav feeder under [MGVCL](#) (Madhya Gujarat Vij Corporation Limited)
- Parmeshwar feeder under [PGVCL](#) (Paschim Gujarat Vij Company Limited)
- Singpur and Dehgamada feeders under [UGVCL](#) (Uttar Gujarat Vij Company Limited)
- Kukarwada and Pariag feeders under [DGVCL](#) (Dakshin Gujarat Vij Company Limited)

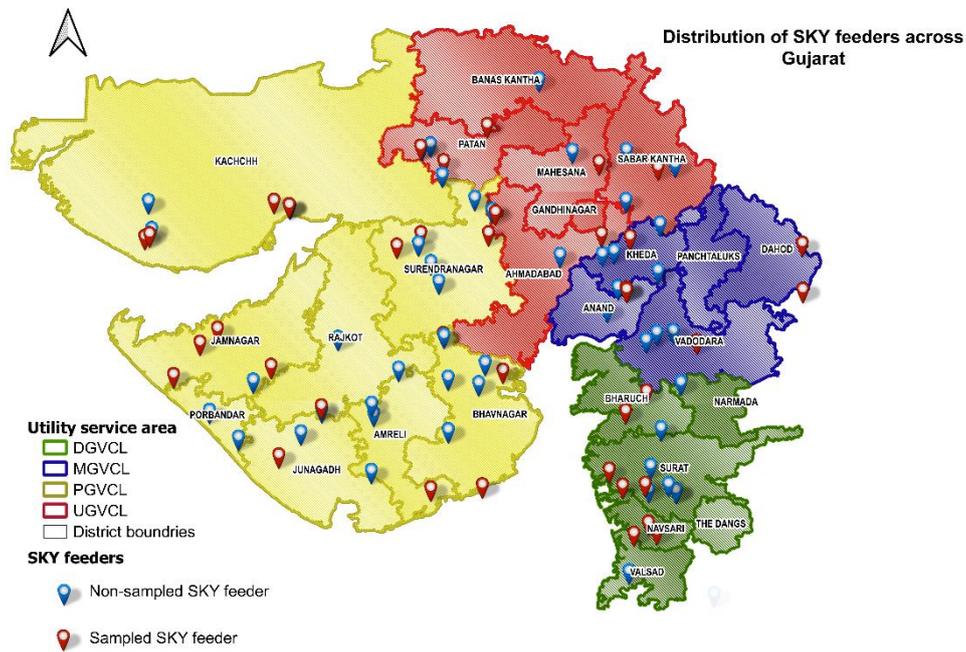
The researchers collected a host of information from farmers under SKY (enrolled and non-enrolled) as well as neighbouring business-as-usual (BAU) feeders, viz,

- Drivers behind participation in the scheme and enrolment barriers
- Characteristics of pumps, type of groundwater structure, crops grown, area cultivated, soil type, irrigation method and aquifers characteristics
- Knowledge of financial design of the scheme and electricity bills issued by the utilities
- The extent of awareness on energy generation and energy used for pumping, usage of SKY app for monitoring energy use.
- General information on operation and maintenance (O&M) of solar panels - cleaning frequency, frequency of power interruptions, panel inverter issues, troubleshooting and timely service provided by solar companies
- Details on the active groundwater market under solar irrigation regime – water selling frequency, area served, and the price charged before and after SKY scheme implementation.

Semi-structured and exploratory interviews with farmers from SKY and non-SKY feeders provided a plethora of qualitative and quantitative data on various parameters. Key officials from the local electricity utility office, namely the UGVCL office in Bayad Block and DGVCL office in Bharuch district, were met, and information on implementation challenges, energy data monitoring, billing details and

scaling-up challenges concerning grid-connected solar were gathered. Despite the multiple challenges of Covid-19, these field interactions allowed IWMI researchers to better understand the heterogeneity across key indicators in the four main regions of Gujarat. Based on this field information, a detailed survey instrument will be developed to gather elaborate information from SKY feeder farmers (enrolled and non-enrolled) and business-as-usual feeder. This will help derive the SKY scheme's impact on agricultural practice, energy usage pattern (a proxy for groundwater abstraction), agricultural income, and groundwater selling.

Photos from the field:



Picture 1: Distribution of solarised feeders under SKY scheme across four utilities



*Picture 2: In conversation with a farmer from Pariag feeder, Bharuch district, Gujarat
Photo: Yashodha Yashodha/IWMI*



*Picture 3: Picture showing solar panels and a dug well from Parameshwar feeder in Botad district, Gujarat
Photo: Yashodha Yashodha/IWMI*

