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Indian farmers could grow power, not just crops

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The Indian state of Gujarat, leading in solar energy innovations with solar parks, canal-top solar plants and roof-top solar systems, is launching yet another novel scheme to harness sunlight.

This week (6 May 2015), the state announced plans to set up four solar plants of one mega watt (MW) each on farmers' fields. The 200 million rupees pilot project allows farmers to grow crops as usual while simultaneously generating power from sunlight from the same piece of land.

If the demonstration is found successful, the scheme will be extended to rest of the state.

Photovoltaic panels on farmlands could feed power to the grid © S. Priyadarshini

"The concept of having solar photovoltaic (PV) panels over agriculture land is finally going to see the light of the day," Thirumalachetty Harinarayana, director of Gujarat Energy Research and Management Institute (GERMI) in Ahmedabad told *Nature India* after the scheme was announced.

Harinarayana's brainchild, the novel idea was proposed by GERMI last year after computer modelling studies showed that the shade cast by solar panels had no adverse impact on the growth of crops. After trying out different configurations, GERMI scientists proposed that a set of PV panels "arranged like a chess board with gaps in between" and kept about five metres above the field, is ideal for allowing enough sunlight to fall on the crops while at the same time generating electricity[1].

"Thus, by laying a roof of appropriately configured photovoltaic (PV) solar panels, farmers can use their land for dual purpose rather than growing only food crops," Harinarayana said.

The power generated by the solar panels can be used to pump water for irrigating their crops and any excess electricity generated can be sold to the power grid. In other words, farmers can augment their income by renting out their land to the government or to the solar developer who erects solar panels while they grow food crops as usual on the same land.

Farmers who feed the people might also produce electricity to feed the national power grid, says Harinarayana. "The land constraint, that currently limits the growth of solar power

would be virtually removed if the new proposal to use cultivable lands is adopted on a national scale," says Sagarkumar Agravat, scientist in-charge of solar projects in GERMI.

Two other GERMI proposals are awaiting adoption on large scale. One involves stacking two layers of solar PV panels one above the other, separated by a small distance, instead of using a single layer. Using this approach a given land area can be used to generate 70 per cent more energy than what is possible with a single layer solar panel, according to GERMI.

Their second proposal, if implemented, could turn major roads into "solar highways". GERMI scientists earlier calculated that a PV roof cover over the 4-lane 205 kilometre long Ahmedabad–Rajkot highway can generate 104 MW of power.

References

1. Harinarayana, T. *et al*. Solar energy generation using agriculture cultivated lands. *Smart Grid Renewable Energy* **5**, 31-42 (2014) doi: 10.4236/sgre.2014.52004