Power to farmers: Gujarat scientists float novel concept

Last Updated: Wednesday, February 12, 2014, 17:27

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Bangalore: A time may soon come when farmers who feed the people of India will also produce electricity to feed the national power grid.

That is the conclusion of an innovative study by Tirumalachetty Harinarayana, director of the Gujarat Energy Research and Management Institute (GERMI) Research Centre in Gandhinagar, and Vasavi Kamili, a student of the Medha Engineering College in Hyderabad.

Their research published Feb 11 in the online version of the international journal "Smart Grid and Renewable Energy" suggests that farmers can use their land for dual purpose rather than growing only food crops.

While continuing to grow foodgrains, farmers may simultaneously produce power by laying a roof of appropriately configured photovoltaic (PV) solar panels over the same land to generate electricity from sunlight, Harinarayana told IANS.

The power so produced can be used to pump water for irrigating their crops and any excess electricity generated may 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 will erect the solar panels while they grow food crops as usual in the same land.

The scientists have found this novel concept feasible after ensuring -- through computer modelling studies -- that the reduction in sunlight caused by the solar roof has no adverse impact on the growth of crops below.

Harinarayana said his scientists systematically examined different solar panel design configurations to identify the one that caused the least reduction in sunlight.

Their studies have shown that a set of PV panels placed at a height of five metres above the cultivated land and "arranged like a chess board with gaps in between" was the ideal configuration that would allow enough sunlight to fall on the crops while generating power at the same time.

They claim that the observed small reduction of sunlight may in fact help the plants to grow better as the reduction was limited to noon time when the level

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of harmful ultraviolet radiation coming from the sun is high.

"The PV panels help to filter off the UV radiation that agricultural scientists know is not good for the plants," Harinarayana said.

For the purpose of computer modelling, the scientists used the solar radiation data pertaining to places in Andhra Pradesh and Tamil Nadu where mostly rice is grown, and wheat growing states of Uttar Pradesh and Punjab.

"While our conclusions are based on computer simulation studies, one needs to make a real estimation during the actual crop season," Harinarayana said.

The researchers say about 50 percent of India's villages were not connected to the power grid due to which farmers were unable to get enough water for cultivation.

At the same time, it was expensive for governments to establish the network of transmission and distribution lines to remote villages.

"What we have proposed is an innovative solution to both problems: it helps to increase farmers' income and also save money for governments," Harinarayana said.

The novel idea is the latest innovation of GERMI scientists who had earlier made two proposals.

One involves stacking two layers of solar PV panels one above the other, separated by a small distance, instead of using a single layer. They showed that using this approach, a given land area can be used to generate 70 percent more energy than what is possible with a single layer solar panel.

In the second proposal, they claimed that India's major roads can double as "solar highways" by having a roof of solar panels over their entire length.

They estimated that a PV roof cover over the four-lane 205 km Ahmedabad-Rajkot highway can generate 104 MW of power while the Ahmedabad-Vadodara highway, 93 km long, can reap 61 MW of electricity.

At present, solar farms and solar parks planned to be set up in India under the Jawaharlal Nehru National Solar Mission require vast areas of barren land that is increasingly becoming scarce.

IANS

First Published: Wednesday, February 12, 2014, 17:27

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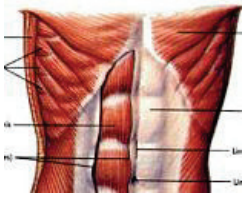

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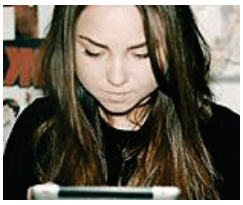

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