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Two techniques show promise for helping farmers conserve scarce water in Punjab, India's breadbasket

By [Sudip Mazumdar](#) | [April 11, 2011](#) | 3

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India is running out of water for crops. Most of the water-intensive agriculture in the nation takes place in Punjab, a state in the northwest that makes up 2 percent of the country's territory but provides more than 50 percent of its grain reserves. Farmers there currently pump out 45 percent more groundwater than is replenished by monsoon rains.

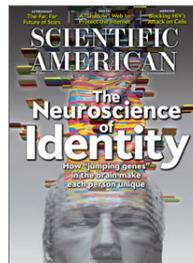
DROUGHT MENTALITY: A farmer in Punjab examines what is left of his crop during a dry period.

Image: Ajay Verma Reuters

The problem has arisen in part because Punjabi farmers have veered away from growing traditional crops that are suited for semiarid land, such as wheat and corn, and turned instead to more profitable, but water-intensive, rice. "If Punjab is to continue as the food grain capital of India, modern agricultural practices will have to take into account the water situation and create a feasible long-range plan for a sustainable future," says Shama Perveen, an associate research scientist at Columbia University's [Water](#) Center, who has been working in the region. She and several colleagues from Columbia, in collaboration with Indian agriculture scientists, are testing a piece of that plan: two conservation tools that could help farmers use less water, even if it won't alter their choice of crops.

One such tool is the tensiometer: a porous, ceramic bulb attached to a color-coded meter that reflects the moisture content of soil. In a preliminary experiment involving more than 500 farmers in 50 Punjab villages, the group handed out tensiometers, which were stuck into fields, including rice paddies. Farmers were told to irrigate the land only when the instruments showed that the moisture content was falling. Those who followed that guideline consumed nearly 30 percent less water than before.

The other technique relies on lasers that detect undulations in fields. Informed by the



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laser scans, farmers can level out any detected bumps before sowing, to help prevent puddles and dry patches and allow for more uniform irrigation. Laser leveling can save up to 20 percent of water usage, says Kapil Narula, head of the Columbia Water Center's India operations.

Later this year the team will introduce tensiometers and laser leveling to 5,000 more farmers in Punjab and to 1,500 farmers in the nearby state of Gujarat. "By involving greater numbers of farmers, we can effectively address the water crisis at least in acutely felt areas," Narula says.

Local experts are encouraged by the results but say they need to be scaled up and combined with other efforts to have a substantial effect. "The challenge is to involve larger numbers of farmers and to educate them about [the tools'] efficacy," says Bhishm Kumar, a scientist at the National Institute of Hydrology at Roorkee. He adds that scientists and farmers need to apply multiple approaches to deal with the crisis, including planting crops that require less water and introducing modern drip irrigation, which funnels water directly to the roots of [plants](#).

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future. They use so much water and never care drawback of over use water. I think tragedy of farming of Punjab or say whole India is attitude of people if people of India don't change this attitude doomsday is not farway

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2. brock2118

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Easy solution: build enough coal powered electrical plants to massively desalinate oceanic water and pump it uphill to the farmers.

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3. eco-steve

07:03 AM 4/16/11

One easy way to improve water retention is to enclose every 20 acre plot with hedges. This greatly reduces evapotranspiration. A second technique is to pyrolyse biomass from the hedges, which converts wood into biocharcoal and hydrogen. The hydrogen can be used to generate electricity, and the ground up biocharcoal ploughed into the soil to improve water retention and hence fertility. And all this without resorting to irrigation!

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