

MAKING IT	ISSUE 10	POWERING UP
	WORDS & PHOTO PAYAL KHANDELWAL	ILLUSTRATION ANDREW COLIN BECK
INDIA	AGRICULTURAL WATER CONSUMPTION 91%	

One farmer’s free invention could produce India’s calories using a tiny fraction of the water —One-Liter Farming

Sundaram Verma says that to nourish each plant in the sun-scorched fields of India’s Rajasthan state, farmers have to pour out 20 liters of water, on multiple occasions—a hot commodity in drought years. What if, he proposed, the same seedling only needed a single liter of water to survive?

That’s the aim of Sundaram’s farming technique, an innovation he has tweaked and tinkered with over the last decade. While he’s shown it can work on trees burned for biofuel and fed to cattle, he’s hoping to prove it out on calorie-rich food crops, oilseeds, and grains, especially as the region grapples with its climate.

I reach Sundaram’s home in Danta, a small village-district, after a six-hour drive from Delhi, passing through scruffy terrain sprinkled with signs of modernity. A handful of cars, computers in shops, ubiquitous mobile phones. His son guides me back to the small study where Sundaram awaits.

Reclining in his chair, Sundaram outlines the main idea behind his technique. It does rain

in Danta but only during the monsoon season. Unlike others in his region, Sundaram prepares his field in such a way that the ground retains as much monsoon rain as possible, reducing the need to irrigate crops in drier months. “This is where the magic lies,” he says.

Out in the fields of Danta, Sundaram shows me his method in action. He leads me to a patch where he’s conducting a pilot project for India’s Oil and Natural Gas Corporation. It boasts about 500 trees, whose trunks will become wood chips for biofuels and whose dark green leaves will feed the local livestock. He singles out a plant that is dry and leafless on top, a victim of the harsh winds of winter. Then he points to its roots, which are still strong—proof that the plant is well-nourished and healthy enough to bounce back.

Sundaram says he first stumbled onto his one-liter method about 15 years ago, when he was studying dryland farming at the Indian Agriculture Research Institute in New Delhi. After over-tilling the soil near a freshly planted sap-



Sundaram stands with his one-liter trees in rural Rajasthan.

ling, he realized he had broken the tiny natural air pathways that guide groundwater through the soil, called capillaries. And over the next few months, he couldn’t find time to water the tree. To Sundaram’s surprise, the plant continued to grow on its own. This led him through a round of experiments that refined his technique.

The first step, he explains, is for farmers to level their fields before the monsoon begins in July. After the first week of rain, farmers deeply plow the field to yank out weeds and allow water to seep into the ground. The process also

breaks up capillaries, so that groundwater can’t rise to the surface and evaporate. In September, before the last rain of the season, farmers plow the land again. This breaks the capillaries on top but leaves the lower-level tubes intact, keeping a layer of water close to the roots.

Sundaram says farmers usually level and plow the field just once, causing the monsoon rains to wash away the topsoil, rather than replenish the ground. Farmers thus have to irrigate the fields frequently and use more water.

Under Sundaram’s method, once the fields are readied before the monsoon, farmers next plant tree saplings into deep pits, with the roots at least 20 centimeters below the surface. Soil is piled on, with a bit of space left empty for watering. In the final step, farmers water the saplings with one liter of water—just one time—and leave the plant to grow without any further



FARMING FOR HONEY

Each year, Anil Gupta takes a week to walk 125 kilometers through India's countryside in search of creativity. In this *shodh yatra*, or journey of exploration, he sources this new knowledge from enterprising farmers and cross-pollinates among others he finds along the way. This is the purpose of his organization, the Honey Bee Network—to support local knowledge and encourage entrepreneurship. Among the more than a million ideas the network has documented: a bull-powered sprayer for agrochemicals and a compost aerator to convert bio-waste into fertilizer. Pollinate ideas from their database below back to your farm or garden.

sristi.org/hbnew

► **MAKESHIFT ON AIR**
Follow Anil Gupta's
shodh yatra at
bit.ly/2pmUcP7

intervention, except for regular weeding. Plants have about an 80 percent chance of surviving, he says, compared to 60 percent with water-intensive conventional methods.

His technique may be novel, but many other farmers out here are also searching for ways to make agriculture an easier and more bountiful pursuit. Take Mansukhbhai Jagani, for instance, who lives in the neighboring state of Gujarat. He's retrofitted a diesel-powered bullet motorcycle into a three-wheeled plow. Late Appachan in southwestern Kerala state created a quicker way to scale betel nut and coconut trees. Two thick rubber bands wrap around a tree trunk and attach to a tiny ladder, which has a foot pedal and a hand grip. By simultaneously stepping and pulling, climbers shimmy up.

So far, Sundaram admits, the allure of less water has not convinced many other farmers to adopt his method. People are skeptical that plants can survive on just a liter of water, and they're reluctant to ditch more familiar techniques.

He's also struggled to find enough funding to test the process out for food crops and at a broader scale. Government programs for rural agricultural innovations are unstable and unpredictable, and officials are no more confident in Sundaram, for now. Villagers have reported to him on various occasions that state farming officials have bribed them to keep an eye on Sundaram; they want to know if he sneaks out at night to water the plants or has any other tricks up his sleeve.

No tricks, Sundaram insists, just a technique so simple it just might work. ☺

OBSERVED

TRADE

PHOTO
SUZANNE LEE

WEST BENGAL
— INDIA

COST OF COW
USD 190

COW MILK PRODUCTION
UP TO 20 L PER DAY



Observed

Men load large cows onto a truck at the weekly cattle market in Birohi, a town close to the India-Bangladesh border. The larger cows are often smuggled across the porous borders by wading through the rivers to be sold at a profit in Bangladesh.