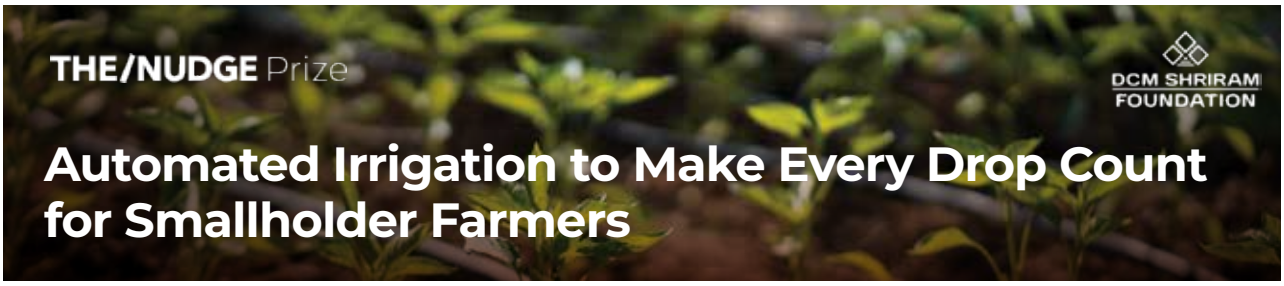

Automated Irrigation to Make Every Drop Count for Smallholder Farmers

Solving India's water crisis is particularly difficult because the agricultural sector which accounts for 80% of the country's water use is highly fragmented, with smallholder farmers making up 86% of farming households.

We know which crops are the most water intensive - sugarcane, wheat, rice and cotton, but it's not enough to create solutions for these crops. We have to factor in the varying realities and challenges of the smallholder farmers who grow them. Many promising technological solutions fail because they are not affordable or profitable for a smallholder farmer, although they might work well in bigger farms or when paired with better resources.

For example, advanced analytics and precision agriculture can all help, but it might not work for every farmer everywhere. To solve this puzzle, we need solutions that approach the problem from different angles, rather than try and scale a few high potential approaches.

Automating irrigation can help, but we need automation that bridges the gap from monitoring to execution in real-time, and is practical and reliable in small farms. This enables optimal water usage, preventing issues like over or under-watering while educing manual labour requirements.

The DCM Shriram AgWater Challenge, a startup challenge sponsored by DCM Shriram Foundation and run by The/Nudge Prize was set up to find innovative solutions that help smallholder farmers gain more control over their farming operations through practical solutions that work on the ground and demonstrate visible benefits and returns for them. Several organisations competing in the challenge are working on making irrigation automation viable for these farmers, tackling this need.

Oscillo Machines has created a product known as the Suvarna 4R eRT, a diesel-run paddy transplanter. The traditional nursery-grown method in paddy is water-intensive, as it requires the nursery to be flooded continuously. Direct Seeded Rice (DSR) is more water efficient, but it is often hard to get farmers to transition.

The Suvarna 4R eRT directly addresses this, with a combination method. The machine has one component that transplants rice seedlings that were raised in a nursery bed into a portion of the main field, while the other part of the same machine drills and directly sows rice seeds into another portion of the main field. This lets the farmer use both cultivation methods simultaneously, and slowly transition to DSR in more areas as it starts working well. This new method also reduces manual work and drudgery for farmers, reducing effort as well as cost.

SICCA by SenseitOut Technologies is another organisation that makes automation practical, with retrofittable IoT systems that can be integrated into existing drip irrigation systems, which then uses advanced wireless tech for remote control of irrigation schedules based on soil data. This lets smallholder farmers harness the benefits of automated irrigation without major infrastructure changes.

The Centre for Environment Concerns has a complementary SWAR system - a root zone moisture diffuser which can be attached to existing drip irrigation systems and automatically applies water or not based on real-time soil moisture levels detected by it near the roots. This improves crop productivity while significantly reducing water consumption.

While these companies apply technology at the soil level, Intech Harness focuses on water pumps, with an AI-driven motor controller. Since many smallholder farmers rely on water pumps powered by erratic power supply, they often use water inefficiently and ruin crop productivity, as they struggle to turn it on and off at the right time. Intech Harness' IoT connected system automates pump operations, eliminating manual intervention and optimising irrigation, saving both water and crop productivity.

What sets these solutions apart is their emphasis on automating the entire irrigation cycle, from data monitoring to intelligent control of water application equipment like pumps, valves, and diffusers. Moreover, by ensuring accessibility through retrofitting capabilities and accommodating traditional practices, these solutions are democratising cutting-edge irrigation automation tech for resource-constrained small farmers by making solutions accessible & practical. This level of automation not only conserves precious water resources but also improves overall irrigation efficiency, resulting in higher crop productivity and cost savings for smallholder farmers.

We need solutions for every type of farmer, and such all-in-one solutions promise to make efficient water use and high crop yield a reality for everyone. By tackling the challenge from different angles – automating transplanting, retrofitting IoT systems, optimising pump operations, and targeting root zones – these organisations are providing a comprehensive suite of irrigation automation tools tailored to the diverse needs of smallholders across India.

"This article is one part of an 8-part series covering agricultural water utilisation in India."