Smart farming: Farmers rely on AI, drones

In Andhra Pradesh’s Devanakonda mandal in Kurnool district, farmers look to the sky for rain to nourish their groundnut and cotton crops. Their landholdings are just two to three acres, and most depend on gut feel and experience to decide when to sow.

Last year, International Crops Research Institute for Semi-Arid Tropics (ICRISAT), the Andhra Pradesh government and Microsoft partnered to add technology to the mix. Microsoft used its Azure cloud platform to study 40 years of data on weather patterns, soil conditions and more, built a modelling framework with ICRISAT, applied machine learning technologies, and started sending SMS advisories on sowing to farmers.

Cloud computing, machine learning and artificial intelligence technologies, and powerful communication and collaboration tools—all of which today come at low costs—are enabling societies to gather and analyse large volumes of data in ways that were impossible before, and deliver critical and useful information to the least privileged. In agriculture, education and healthcare, technology has the potential to transform lives and a number of companies are taking the first step.

Rajan Anandan, MD of Google India, says it’s a matter of time before someone does in healthcare, education and agriculture what Airtel did in telecom—revolutionise the sector by bringing quality service at low prices.

In Devanakonda, the SMS alerts proved their worth when it rained in May, and some farmers decided to sow. The model recommended June, and 175 farmers went by this advice. Those who sowed early suffered because there was a dry spell, which destroys groundnut, after the plants flowered. “Those who went by our advice saw an average 30% higher yield than those who sowed early,” says Suhas P Wani, director of Asia Research Program at ICRISAT. The programme has been expanded to cotton, ragi, rice and maize in 13 districts of AP. ICRISAT and Microsoft have entered an understanding with Karnataka to develop an agricultural commodity price forecasting model for tur crop. “This year we should reach 2,500 farmers in Andhra, and 1,200 in Karnataka. By next year, the number should be 10,000 in each state,” says AVR Kesava Rao, honorary fellow and scientist (agroclimatology) at ICRISAT.

A senior Cisco executive notes that two-thirds of the population is in rural areas, but two thirds of our resources are in urban areas. “New technologies are enabling the transfer of the latter strengths to the former,” he says.

Cisco was among the first to attempt socially transformative projects using technology. In 2010, when floods ravaged parts of north Karnataka, the networking giant adopted five villages in Raichur district, rebuilt over 3,000 homes, and established four networked schools and a digital healthcare centre. Teachers in Bengaluru delivered live video courses over the internet in English, mathematics, science, and social science to 1,000 children in the newlyequipped schools. The healthcare centre enabled live remote consultations with doctors in Bengaluru.

Anil Bhansali, MD of Microsoft India R&D, says the company worked with the AP government to develop a model that can predict which student is likely to drop out of school so that authorities can make appropriate interventions.

Similarly, Nandan and Rohini Nilekani’s EkStep is using technology tools to measure the learning and performance levels of government school students, and determine appropriate interventions. EkStep estimates that it has touched 1 to 3 million children through its partner organisations. Shankar Maruwada, co-founder and CEO of EkStep, says technology by itself may not solve issues, but can improve the capabilities of people, organisations and governments to solve problems.

A number of startups are working on a variety of models that exploit new technologies. IIT-Madras graduate Vivek Rajkumar’s Aibono uses drones to do multispectral aerial imaging of plant leaves to understand the health of a crop, and advises farmers on what NPK (nitrogen, phosphorus, potassium) fertiliser ratio to use. “A simple change in NPK ratio can alter production by a good margin,” says Rajkumar, who has been funded by early Facebook investors Venky Harinarayan and Anand Rajaraman, and works with more than 250 farmers in the Nilgiris.

Rohtash Mal, a former CEO of tractor firm Escorts, has established what can be called an Uber for tractors. “Only 10% of the country’s farmers can afford farm machinery. How to reach the country’s 90% was our question,” says Mal. His EM3 provides
farm machinery and vehicles on demand. Technology allows him to ensure speedy service and transparent billing.

In healthcare, technology is easing the path in places where doctors are hard to reach. Geetha Manjunath's Niramai, for instance, uses thermal images and artificial intelligence to assess energy level in cells and detect breast cancer remotely and at lower costs. Bengaluru-based SigTuple uses a small camera to read pathology samples and send the data to a cloud server that analyses and produces a digital report instantly.

However, large-scale commercial models are yet to emerge. Long-term success may require users to pay for what they use, and the participation of private entities who have the knowledge and incentive to run such projects. The Cisco executive says the country is at the phase of getting people to understand what technology can do for them, and large, successful projects will emerge in time.