FORTUNE INDIA

Data, Trust, and Technology will Decide India's Next Harvest

India's challenge and opportunity is to ensure that digital tools become an everyday practice.

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INDIA'S AGRICULTURE is at a turning point. The sector supports nearly half of India's workforce and contributes about 17% to GDP. Rising challenges such as erratic rainfall, heatwaves, and shifting crop patterns erode productivity. The country's yield gap with global averages underscores the urgent need for innovation.

At the same time, there's a quiet revolution brewing across India's farms. From tractors and tillers to drones and data platforms, technology is reshaping food production. The next phase of this transformation will depend not only on new tools but on how effectively they are trusted, scaled, and shared.

What's changing

Globally, 'modern agriculture' now means more than tractors or irrigation pumps. It includes precision agriculture—the use of GPS-guided machinery and data analytics to apply fertiliser or water exactly where needed; remote sensing, where satellites track crop health and soil moisture; drones that spray fields or collect imagery; and digital advisory tools such as mobile apps or fintech platforms that deliver advice, credit, or insurance to farmers.

The Digital Agriculture in Action report by FAO and ICRISAT notes India's farm mechanisation is only around 40-45%, compared to China's 57%, Brazil's 75%, and the U.S.'s 95%. At the same time, India is emerging as one of the fastest-growing drone markets with a projected annual growth rate of 18%. Agricultural drone adoption is currently led by Punjab, Haryana, Andhra Pradesh, and Tamil Nadu, primarily among large-scale farmers. Broader adoption across regions and farm sizes will require sustained government support.

In addition, the Indian Space Research Organisation has boosted the availability of remote datasets with satellite launches. Forecasting agricultural output using space technology has emerged as a comprehensive programme to generate crop forecasts at district, state, and national levels for major crops. Meanwhile, the government's Digital Agriculture Mission and AgriStack initiative are building national data platforms to link weather, soil, and farm records to services like credit, insurance, and market access.

40-45
PER CENT
of farms in India are mechanised, compared to 57% in China, 75% in Brazil, and 95% in the U.S.

Lagging tech adoption

In Odisha, a farmer, aided by the state government, used drone technology to spray fertiliser on 640 acres over one-and-a-half years. The farmer extended the service to other farmers. Work that once took hours was completed within minutes. Digital advisory platforms such as Plantix leverage AI and deep neural networks to identify crop diseases and pest management. The Plantix app has more than 10 million downloads in India. DeHaat, a full-stack agritech platform, now reaches millions of farmers with pest alerts and price information. Fintech-linked platforms such as Samunnati offer loans tied to verified farm data.

Yet, the adoption is uneven. Many small holders find advanced tools costly or difficult to use. A drone service can save time, yet fragmented landholdings, lack of trained pilots, and patchy rural connectivity weaken the economics of adoption. Sensors and satellite-based advice often fail to reach the smallest farms, where digital literacy and trust remain low. Business models such as custom hiring centres or shared rental platforms are still finding their footing.

Imperative shifts

Bringing digital agriculture into the mainstream will depend on four coordinated shifts, which are already underway.

Improved access and affordability: Most Indian farms are small. The average farm size in India is estimated to be about 1.08 hectares. They cannot buy expensive machines outright. Custom hiring centres and Farmer Producer Organisations that share drones or precision devices allow costs to be spread across members. FPOs could be game changers in digital agriculture as they help consolidate larger plots of land that are then amenable to technology rollout.

Quick results: Farmers must experience tangible benefits quickly. Technologies that lower costs, boost yields or cut labour within a season are far likelier to gain traction. Publicly sharing data on returns, such as water saved or yield increases, will help build trust faster than top-down directives.

Localised, trusted tools: Advisory apps and voice services should speak regional languages, reflect local crops and soils, and use trusted intermediaries such as extension workers or trained peers. Transparency about how data is collected and used is crucial for building confidence.

Robust digital infrastructure: India's digital infrastructure will be the backbone of this transformation. Low internet penetration in rural areas is a major obstacle to the adoption of precision farming. The government's ongoing AgriStack and Krishi-DSS platforms are a step in this direction.

The broader picture

Globally, the trend is clear: tech and data are becoming as critical as seeds and soil. The Digital Agriculture in Action report also notes that precision and digital agriculture can raise yields by 10-20%. For instance, India's national crop forecasting system using satellite data—FASAL—reports an average savings of 20–30% in water consumption and an average increase of 8-15% in crop yield with a maximum range of 20%. But they also warn that these benefits accrue unevenly unless access and affordability are addressed.

India's challenge and opportunity is to ensure that digital tools become an everyday practice. When technology delivers visible results in the form of lower input costs, less water stress, and better market prices, farmers would be quick to adapt. The next harvest, in every sense, will depend on how effectively data, trust, and technology are brought together to serve the millions who feed the nation. F

(Views are personal.)

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Digital agriculture can be mainstreamed if there are four coordinated shifts: improved access and affordability; quick results; localised, trusted tools; and robust digital infra.