PHOTOGRAPH BY **NARENDRA BISHT**

THE AGTECH TRANSFORMATION

How a combination of government push and private sector enthusiasm is changing Indian agriculture.

BY JOE C. MATHEW

ABOUT 18 MONTHS AGO, Union Ministry of Agriculture And Farmers Welfare helped start-up Star AgriBazaar Technology (AgriBazaar) access digital land record data of villages in Una (Madhya Pradesh), Mathura (Uttar Pradesh) and Kota (Rajasthan) districts. This was part of an agreement to prepare a database of farmers, farmlands, soil health, crop patterns and agricultural practices. The aim was to build an open source and inter-operable agriculture digital public infrastructure (DPI) for creating farmer-cen-

a fertile area for intervention.

AgriBazaar's real-time dashboard (developed alongside government's pilot), for instance, can provide information about nearly 4,20,000 farms owned or managed by 4,13,000-plus farmers in three districts where it implemented its pilot. It takes seconds to access all records of a farm—from ownership details & structure (single, joint, leased) and contact details to crop pattern, benefits availed through government schemes and mechanisation status. AgriBazaar can also provide weather and crop advisories and estimate yield and revenue. "We have collected the entire ground data through satellite images. We have three data sets—farm data where we have geo-tagged the farm, crop data and weather data. The three help us predict quantity and quality of harvest. Our intelligent data engine AgriBhumi is digitising the farmer's crop journey," says Amith Agarwal, co-founder and chief executive officer, AgriBazaar. The app also provides a list of recommended crops based on soil type. "Our Cloud platform has 162 crops," says Agarwal.

Timely alerts can also increase farm productivity. That's why agriculture ministry asked not-for-profit Wadhwani AI (Artificial Intelligence Unit of National Entrepreneurship Network) to scale up its AI/ML (machine learning) powered pest management solution for cotton and offer it to 50,000 farmers during the pilot. Wadhwani AI's digital solution is an AI/ML powered tool that can provide crop protection advice by seeing the image of the pests. "The farmer has to install pheromone traps to attract the pests 40-45 days after sowing as that is the usual time for infestation. The farmers have to empty these traps at least once a week, put the pests on a clean white paper, click the image and upload it on our system. The advisory is instant. The farmer can get recommended pesticides the same day. Delay in using pesticide can cause up to 20-30% crop loss," says J.P. Tripathi, associate director, Agriculture, Wadhwani AI.

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The AI tool has been so successful that Wadhwani AI is trying to add features to its mobile app. It is trying to develop similar models for other pests too. "We have started work on maize and chillies and are in discussions to include pests and diseases of paddy. We are trying to cover mango, maize, chickpea, paddy and chillies," says Tripathi. The not-for-profit entity is developing a data collection tool to understand actual versus recommended farm practices. Pilots for digital farm diary will begin in July 2023, says Tripathi.

Efficient Use Of Resources

Digital technologies can make machines more relevant and precise. For instance, a drone, a tractor or a water pump can transform the farm if programmed for a coordinated response. Real-time data is the key. "Drone adoption has a significant potential to improve effectiveness of agri inputs, reduce use of water, boost farm mechanisation and drive precision agriculture practices," says Arun Alagappan, executive vice chairman, Coromandel International. In December 2022, Chennai-based Coromandel invested in a drone start-up, Dhaksha Unmanned Systems, to become strong in unmanned aerial systems solutions.

Even the biggies are interested. Global crop sciences major Bayer has announced a partnership with Bengaluru-based General Aeronautics Private Ltd. to provide DGCA-approved drone spray services for crop protection. It has been helping rice, cotton, and soybean farmers since 2022 kharif season. Simon-Thorsten Wiebusch, country divisional head, Crop Science Division of Bayer for India, Bangladesh & Sri Lanka, says the company plans to add corn, potato, wheat and chilli depending on approvals and demand. "To begin with, more than 50 drones will be made available for around 25,000 farmers. This will create awareness among 1,00,000 farmers. The services (along with agronomic advice) will benefit small farmers in Punjab, Haryana, Madhya Pradesh, Odisha, Maharashtra, Andhra Pradesh and Karnataka, among other states," says Wiebusch, adding mechanisation is important for advancing farming in India. "We believe agriculture in the country is collectivising, mechanising/digitising and becoming more sustainable. We remain focused on our commitment to reach 100 million small farmers by 2030 and believe creating opportunities for rural entrepreneurs and developing business models around drone services will serve this purpose."

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MILLION

Number of small farmers that Bayer wants to reach with its drone services by 2030.

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Mumbai-based Carnot Technologies has made tractors more efficient. Its AI-enabled IoT kit transmits data to a mobile app and helps farmers track performance of tractors—acreage covered, fuel status, etc. It also offers pay-per-use solutions to those who rent out tractors. Mahindra & Mahindra is a strategic investor. Carnot is also a service contractor for Mahindra's Krish-e app that provides personalised crop calendar and information about land preparation, crop sowing, crop planning, fertiliser management, seed treatment, pest/disease management, diagnosis and treatment of crop issues, weed treatment and irrigation.

Assured Markets

Once crop is harvested, the farmer's objective is getting best value for his produce. In spite of government-regulated markets, private market yards, private procurement channels and government procurement systems, a significant number of India's marginal farmers do not get remunerative prices. The situation is worse for perishable crops. Agri-tech firms are bridging the gaps.

For instance, agribusiness major ITC, one of India's biggest buyers of agricultural produce, has launched a super app called ITCMAARS (Metamarket For Advanced Agriculture And Rural Services). ITCMAARS, building on ITC's e-Choupal platform, has created a phygital (physical plus digital) ecosystem that gives small farmers hyper-local advisories, access to quality inputs, market linkages as well as allied services like pre-approved loans. ITCMAARS also enables precision farming through phygital tools like online soil testing and customised crop nutrition services. A company spokesperson says ITCMAARS covers 1,105 farmer producer organisations (FPOs) in nine states—Uttar Pradesh, Rajasthan, Madhya Pradesh, Maharashtra, Bihar, Karnataka, Andhra Pradesh, Telangana and West Bengal (next year) with 5.1 lakh farmer registrations. "Under ITCMAARS, 10 FPOs are planned in 2023-24 in Bankura, Howrah, Midnapur and Hooghly districts of West Bengal. It has developed a potato module (crop calendar, package of practices specific to West Bengal) and regionalised the app in Bangla. The aim is to reach 10 million farmers. The range of products and services will continue to evolve over time," she says. ITC is also a bulk procurer of commodities like wheat and potato.

The pilots by NCDEX e-Markets and Ninjacart centered around digital marketplace platforms that can be scaled up. Ninjacart claims to be India's largest fresh produce supply