

Charting the agri-tech course

New methods are being developed to improve agricultural produce and expedite quality assessment

In July last year, Punjab Agri Export Corporation (Pagrexo), a state government undertaking, decided to deploy block chain technology in potato fields from the rabi season. The project involved certification and traceability of seed potato right from the nucleus to the seed level (harvest). Under the project, the quality of seeds is checked before sowing and geo-tagged. The main objective of geo-tagging is to check falsification of plantation claims.

Punjab produces around 27 lakh metric tonnes of potatoes annually and supplies 60-70% seed potato to domestic markets. Despite this fact, farmers have not been getting remunerative price for their crop.

So, the idea behind using the technology was to protect the interests of Punjab's farmers and at the same time maintain the status of being the largest potato seed-producing state.

By leveraging block chain technology, the potato farmers across the country would be able to trace the origin of the seeds they buy. Using technologies such as barcode and QR code, the software solution will allow the farmers to cross-check whether they are buying genuine seeds from Punjab or not.

For the purpose, Pagrexo tied up with Bengaluru-based start-up Cropin Technology Solutions. “Our initiative is intended to protect our farmers from further financial loss. We are confident that our efforts, coupled with the smart use of technology, can deter unscrupulous elements,” said Manjit Brar, managing director, Punjab Agri Export Corporation.

A host of start-ups are coming up with innovative technology to transform conventional agriculture practices. They have developed state-of-the-art technologies by deploying automation, artificial intelligence (AI), the Internet of Things (IoT) etc. for the beleaguered farming community.

Transforming procurement

According to Nasscom, post-harvest inefficiencies in India result in an average annual loss of \$13 billion. One of the largest contributing factors to this loss is an outdated system of intuition-based quality assessment for farmers’ produce, especially in the case of grains. This testing method has impacted everyone in the agriculture industry, from farmers to consumers. Further, slow processing time and inaccurate tests create a ripple effect across the entire supply chain, with recalls, consumption of unsafe food products, unfair wages for farmers and a decline in consumer trust being some of the side effects.

With significant advances in agri-tech, new methods are being developed to improve the quality of produce and the speed with which quality assessment can occur. Mohali-based start-up AgNext provides AI-based solutions to

modern-day agricultural development in an industry which is in desperate need of change.

AgNext's QualiX solution provides a three-tier approach in a B2B environment. It offers spectral analytics, computer vision and sensor analytics to ensure that post-harvest yields are tested quickly and effectively. Test results are shared via bluetooth capability with the users.

“We are working to increase the scope of crops that can be tested through QualiX service; this facility has significant scalability,” says Taranjeet Singh, founder, AgNext Technologies.

The company already has a diverse array of crops available for quality assessment. “Our target key markets are grains (including wheat, rice, soyabean, mustard and pulses), spices (turmeric and chili) and beverages (tea, coffee, milk),” he adds.

While several companies tend to specialise in a single testing solution, the company offers three distinct technologies. AgNext's customers utilising spectral analytics and computer vision include warehousing, retail, processing and trade industries. Cold storage and grain silos under the umbrella of warehousing also utilise sensor analytics as a key agri-tech solution.

Testing purity of milk

Spectral analytics for milk has an estimated reach of over 5 million farmers, with the health impact of contaminated milk being a crucial factor for providing more accurate quality assessment in dairy produce. “We have innovated

breakthrough affordable cutting-edge technologies to become the first company in India to come up with instant on-site detection of milk quality and prevalent market adulteration,” claims Taranjeet.

“Our affordable solution not only detects the composition of fat, protein & SNF in milk, but also the presence of any adulterant like detergent, urea and palm oil in less than 30 seconds, all through a single scan. It can be implemented at milk collection centres offering instant milk quality checks and ease of payment through prevalent market models,” he adds.

In a recent study, the Food Safety and Standards Authority of India (FSSAI) found that two-thirds of India’s milk supply contained contaminants such as urea, detergent and paint. Issues of poor quality and adulteration extend across India’s agricultural community, impacting tea, wheat, grains, spices, herbs etc.

Agricultural robotics

The use of robots to plant, reap and process grains would make the process more efficient and easier to perform on the scale required to feed the world’s growing population. Bengaluru-based Green Robot Machinery (P) Ltd is planning to launch robots for cotton-picking by the kharif season next year in North India. The field testing is at an advanced stage. “The robot has been designed in such a way that computerised vision detects and locates the precise 3D coordinates of the bloomed cotton from the images of the plant. A robotic arm uses these coordinates

to pick the cotton and the arm then uses vacuum for precision picking of cotton and avoids picking any contaminant,” says promoter Manohar Sambandam. He says the machine is being designed by factoring in the cost of manual labour. Many equipment makers are planning to introduce this machine on pay-per-use basis or on a rental model, he adds.

Handling stubble waste

Punjab-based A2P Energy Solution (P) Ltd seeks to provide solutions to the pressing issue of stubble-burning. It is working with farmers in Punjab by buying crop residue and helping them earn additional income from farm waste by converting it into useful products for the energy sector.

In the current fiscal, the company converted over 4,000 tonnes of paddy waste into fuel pellets and sold it to the industry to fuel its boilers. Punjab generates 20-25 million tonnes of paddy stubble annually.

For its sustainable solution, it won a prize of \$100,000 at Global Makers Challenge 2019 in the sustainable energy category during the Global Manufacturing and Industrialisation Summit held in Yekaterinburg, Russia.

Farm management tool

Mooo farm, an innovative Australian agri-tech company, uses global leadership and expertise in the areas of skills, agri-business and technology to drive social change in developing countries such as India. The startup is working with dairy farmers in Punjab to enable them access to better technology by inserting a complete dairy farm

management tool with a built-in e-commerce platform into the dairy farming process to enhance their income. For facial recognition of cattle, it won a prize of \$30,000 from a World Bank Group entity in Data Analytics category in July 2019.

The man behind the firm is Param Singh, an Indian-Australian. His company, Monsoon Impact Incubator, is also planning to support, mentor and fund early-stage, innovation-based start-ups that can have an impact on the lives of the people, especially the marginal sections of society, in Punjab.

Spearheading change

Although the northern region is far behind in terms of the number of start-ups, some research institutions and start-ups are set to revolutionise the agriculture sector by deploying AI and IoT. To transform the farming sector, companies and research organisations have published more than 200 patents in smart agriculture and crop sciences space in the past five years. Many of these patents are under examination to be granted. Organisations such as Punjab Agricultural University (PAU), National Agri-Food Biotechnology Institute (NABI), Centre of Innovative and Applied Bio-processing (CIAB), Chitkara University and Chandigarh Group of Colleges hold Intellectual Property Rights (IPR) over a diverse range of latest technology. Also, companies like AgNext Technologies, Pindfresh, Osaw Industrial Products and Fare Labs Pvt Ltd are focusing on new-age farming technology.

Major patents

- PAU recently filed patents for technology to reduce grain moisture, and for bacteriological food-testing kits
- Chitkara University has filed a patent for real-time monitoring of crops
- AgNext Technologies, a Mohali-based company, is providing cutting-edge technological solutions to revolutionise the agri-food value chain
- LPU has filed several patents in the area of Internet of Things to monitor the health of plants, pesticidal composition and image processing of crops

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