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COVID-19: The Internet of Things and Agritech

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The COVID-19 pandemic has inspired a range of Internet of Things (IoT) and AI innovations to help stop the spread of the virus. This is an Agritech sector-specific edition of COVID-19: IoT and Cybersecurity.

Past editions are found on the PETRAS website.

COVID-19 has disrupted the world, but is creating opportunities in the Agritech sector

Despite the disrupting effects of the pandemic, the Agritech sector is continuing to evolve. Traditional farming practices are rapidly being replaced by emerging technologies. China-based Agritech company, Alesca Life's CEO, Stuart Oda said that "agriculture and agricultural technology have come into sharp focus from the fallout of the COVID-19 outbreak. The coronavirus outbreak has made many governments more aware of the significance of agricultural technology, and venture capital has started focusing more on the sector."[1]

Several Agritech start-ups are helping in streamlining the processes faster and more efficiently by offering innovative solutions using technologies such as remote sensing and data analytics.

Shortage of agriculture workers, leading way for technology innovations

With fields of fruits and vegetables left unharvested, the coronavirus pandemic has led to a shortage of agriculture workers globally. Furthermore, due

Overview

- Traditional farming practices are rapidly being replaced by the emerging technologies. Agritech companies are helping in streamlining processes by offering innovative solutions, using technologies like robotics, remote sensing and data analytics.
- The coronavirus pandemic has led to a shortage of agriculture workers globally. Border restrictions have further intensified the shortage. This has in turn accelerated the use of automation and robotics in farming, such as 'vertical farming'
- COVID-19 has also led to post harvest losses, with fruits and vegetables left unharvested. Scientific Warehousing and Blockchain technology are being set forth to help reduce these losses and introduce high-end solutions for farmers.
- Governments and public bodies are responding to the pandemic by offering relief packages and launching technology and research centres for Agritech stakeholders.
- As COVID-19 has accelerated the use of technology in Agriculture, Agritech start-up firms are raising capital by catching investors' attention from all over the world.
- Globally, there is a much greater push for sustainable farming and nutrition given the threat of COVID-19 co-morbidity conditions. Several companies around the world are developing innovative chemical reduction technologies using AI, deep learning etc.
- COVID-19 has boosted many food trends such as a shift to online food stores and opening of direct-to-consumer channels along with decentralisation of food systems.

to the pandemic restrictions, many agriculture workers could not cross borders, adding to a further shortage of workers in the UK. This challenge is in turn leading to a rapid increase in the interest in automation and robotics to replace manual labour. Saga Robotics has reported that it "received 40 orders from UK farmers for its Thorvald robot, which transports crates of produce, weeds and harvests strawberries."[2]

Vertical Farming

There has also been a significant increase in 'vertical farming' due to a lack of workers. Intelligent Growth Solutions' CEO, David Farquhar, reported to FT that, "the pandemic has prompted a spike in interest in 'vertical farms', where batches of crops can be individually watered, fed and lit using LED lights, allowing them to be grown year-round with minimal labour near their markets, regardless of local soil or weather conditions."[3]

In Scotland, the company also set up a demonstration farm where 9m tall towers are created by stacking trays of produce that are packed, seeded and managed automatically and remotely.[4]

With the disruption in processes, supply chains and logistics in the agriculture sector due to the pandemic, several Agritech start-ups are helping streamline processes faster and more efficiently by offering innovative solutions using technologies such as remote sensing and data analytics.[5]

Minimising post-harvest losses through Scientific Warehousing

The Coronavirus pandemic has also led to an enormous quantity of harvested crops getting wasted due to archaic procurement, storage and inefficient warehousing methods. Storage losses in countries such as India are as high as INR 100k crore (£10.5 billion), leading to rising inflation and hunger problems.[6]

To address these challenges of post-harvest losses, New Delhi-based Agritech company SLCM Ltd. has deployed scientific warehousing that tracks the quality and quantity of the goods stored at its warehouses in real-time using Artificial Intelligence and Auto ML, by deploying technologies such as SAP, Android Jelly Bean, and My SQL, among others. The company has also developed a real time process management system, 'Agri Reach,' to operate any warehouse agnostic to infrastructure, location, and weather pattern across any kind of agricultural crop along with advice from experts of the field. This system has reduced India's post-harvest losses of 10% to a just 0.5%.[7]

Bridging the gap through Blockchain Technology

On September 1, Dubai Multi-Commodities Centre (DMCC) and Mumbai-based CropData Technology[8] launched a blockchain-based platform called, 'Agriota E-Marketplace', which will connect Indian farmers directly with food industry stakeholders in the UAE, thereby reducing the middlemen.[9]

Last month, Agri10x has introduced blockchain technology along with AI and IoT, to provide high-end solutions like information about the ideal time to plant any crops and identifying best farming techniques from farmers world-wide. The firm promoted sustainable farming though the use of technologies. Agri10x has partnered with the Indian Government, to get exclusive access to governments' 500,000 common service centres (CVCs) which will help farmers across India to register on Agri10x platform directly. The founder called the COVID-19 pandemic a blessing in disguise for his firm and for the Agritech businesses in general.[10]

Governments response to COVID-19's impact

Governments are introducing hefty relief packages to modernise and revive the sector after the adverse effects of COVID-19. Last week, the US Department of Agriculture announced a direct federal payment of £28.8bn to farmers in 2020.[11] Promoted by the Ministry of Agriculture, the Agricultural Development Bank of China promised £342 billion (3 trillion yuan) in loans through 2020 to finance key projects.[12] In May, the Indian government had also announced £17 billion (INR 1.63 lakh crore) funding to stimulate the agriculture and allied activities sector.[13]

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Government agencies are also launching various research centres and programmes in a bid to push for a revival of the Agritech sector.

Crop Science Centre to be launched in Cambridge

Cambridge University's Department of Plant Sciences has partnered with agricultural technology innovator the National Institute of Agricultural Botany (NIAB), to launch a new Crop Science Centre on October 1. This comes as a response to deal with increasing challenges of hunger and famine created by the Coronavirus pandemic.[14]

The centre aims to enhance sustainability, resilience and to transform global food production systems using edge plant science, and become a global hub of crop science. The research is funded by the Bill & Melinda Gates Foundation, YKRI Research England, the Department for International Development, CUPGRA and NIAB Trust.[15]

Agritech Hackathon for dealing with COVID-19 response

An Agritech hackathon[16] is being organised on September 23-24 by the Agri-Epi Centre, one of the four Agri-tech Centres[17] formed by the UK government. The Hackathon will seek technological solutions for addressing challenges arisen due to COVID-19 in Horticulture and livestock/veterinary fields - especially in relation to the shortage of labour and travel restrictions of vets to conduct farm diagnoses. The winning teams will be given access to the Centre's technical and project management expertise and research facilities including testbeds, and other research assets.[18]

As COVID-19 has accelerated the use of technology in Agriculture, Agritech firms are receiving funding globally

InnovateUK impressed by Strawberry Picking Robots

A UK and Norwegian start-up, Saga Robotics, which develops fleets of autonomous strawberry pickers and agri-robots, including the Thorvald robot that blast fungus with UV light, has just raised £8.6 million ($11.3 million) from four different European firms.[19]

The company has also won a grant from Innovate UK for its 'Robot Highways' project which, according to Innovate UK is, "the largest known global demonstration of robotics and autonomous technologies on a farm. The robots assist farmers in carrying out energy-intensive physical tasks, such as picking and packing fruit and treating crops."[20]

Indian Agritech firms catching investors eye from world over

Last week, global tech giant Google funded £21.7 million to the Indian food-tech company, Dunzo for its 'app-based on-demand platform', with hyper-local focus. Earlier in May, the Bengaluru based Dunzo had also partnered with another US firm, Pepsico to provide US goods to its Indian consumers.[21]

Last week, another Bengaluru based Agritech firm, Aibono raised £1.5m ($2m) in a second-round funding with Japanese venture capital firm Rebright Partners and Mitsui Sumitomo Insurance Venture Capital. The start-up uses AI based end-to-end aggregate platform and demand-supply syncing technology, to help farmers grow premium perishable vegetables and herbs with better yields.

"Aibono leverages data science driven demand-supply synchronisation, farm analytics and 'just in time' engines to prevent food wastage, improve agricultural efficiency as well as stabilise livelihoods of farmers specialising in perishable vegetables."[22]

Autonomous chemical reduction technology leading way towards more sustainable farming

Israel's firm Greeneye Technology has developed an autonomous technology powered by an AI and deep learning platform that uses camera sensors to detect and spray weeds in real-time. The technology helps to spray only on the weeds and not on the crops, which has been a major challenge with traditional methods.[23]

This is especially useful as the EU Commission has set out a proposal to reduce pesticide usage by 50%. According to the company, their technology can reduce the farmer's herbicide usage by 65–92%. These impressive developments has helped the company to raise about £5.5 million ($7m) with the agri-chemicals giant Syngenta and international venture capital fund JVP.[24]

Other companies working on chemical reduction technologies are also catching investors' attention. On Sept 10, automated pest control start-up Trapview, a Slovenian firm, received funding of

£3.4 million from the Japanese agri-manufacturing giant Kutoba Cooperation. Trapview's monitoring and forecasting platform also uses advanced artificial intelligence to get accurate and real-time understanding of pest population in any specific area.[25]

Last month UK's Spotta, raised almost £1 million ($1.2m) seed capital with Boston based, Remus Capital, Cambridge Angels and a few other investors for its smart pests' systems platform that uses AI to spots bugs and detects insects in the crops.[26]

COVID-19 impact on food trends

COVID-19 has boosted many food trends and automated a lot of traditional processes. There has been a rapid increase in online food delivery, and direct-to-consumer channels, as well as a decentralisation of local food systems. COVID-19 also led to the closure of many brick-and-mortar stores with more food producers now opening e-commerce channels. The pandemic has also pushed meat shortages around the world with many companies and slaughterhouses in US, Brazil and Canada -which account for more than 65% of meat filing- for bankruptcy.[27]

Another rising trend is the focus on sustainable foods and nutrition given the threat of COVID-19 co-morbidity conditions such as diabetes. The consumers want to know where their food is coming from and how it is produced.[28] Recently, the UK Government introduced a national obesity strategy in a bid to support healthy eating and weight loss.[29]

But will these trends continue in the Post-COVID world as well?

Many experts think that the changing consumer demands will remain same post-COVID as well and these trends will continue in the future. The rapid development and deployment of robotics and other technologies are simplifying the traditional processes.[30] The increasing use of emerging technologies like AI and IoT in agriculture to address the challenges of COVID-19 is paving the way for more efficient and sustainable ways of farming including sustaining famers' livelihood and fighting famine.[31]

Companies are de-risking their businesses for the future and swiftly adopting automation to make the businesses much more resilient. There have also been lessons learned. For example, earlier adoption of automation could have gone a long way to avoid outbreaks of the virus at meatpacking plants.[32]

Endnotes

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