

Satellite imagery, artificial intelligence to improve farm yields in Maharashtra

The Maha Agri Tech project attempts to mitigate agricultural risks by using data analytics to plug gaps.

Written by Kavitha Iyer | Mumbai | October 7, 2019

Launched in January this year, the Maha Agri Tech project seeks to use technology to address various cultivation risks ranging from poor rains to pest attacks, accurately predict crop-wise and area-wise yield and eventually to use this data to inform policy decisions including pricing, warehousing and crop insurance. When farmers in six districts of Maharashtra begin sowing for the coming rabi season, this project will enter its second phase where artificial intelligence and satellite imagery will be used to mitigate risks. Fields of the farmers that are part of the project will be monitored via satellite images at every stage right until the harvest.

In its first phase the Maha Agri Tech project used satellite images and analysis from the Maharashtra Remote Sensing Application Centre (MRSAC) and the National Remote Sensing Centre (NRSC) in Hyderabad to assess the acreage and the conditions of select crops in select talukas. In its second phase, various data sets from diverse data providers will be combined to build yield modelling and a geospatial database of soil nutrients, rainfall, moisture stress and other parameters to facilitate location-specific advisories to farmers.

Already, officials said, satellite imagery helped analyse the extent of crop destruction in parts of western Maharashtra after the floods this August. Once indicative crop yield prediction and accurate analysis of highly localised soil health/moisture conditions is possible using satellite imagery combined with artificial intelligence, policy decisions and advisories ranging from crop suitability, inventory, crop damage assessment and early season crop forecasts can be based on these. Working on the coming rabi season simultaneously are the MRSAC and the NRSC that have expertise in analysis of satellite imagery, as well as other agencies providing diverse kinds of data, such as Mahavedh (decentralised rainfall data from over 2,000 automated weather stations), Groundwater Survey Development Agency, CROPSAP (the agriculture department's 2011 project for crops and pest surveillance), etc.

EXPLAINED

How technology use helps farming

Agriculture in Maharashtra has remained highly vulnerable to the changes in weather patterns. A big reason for this weakness is that a very low percentage of the farmland is covered by canal irrigation systems. The use of satellite images, drones, and machine learning can plug some of the productivity gaps by enabling both farmers and policymakers to plan better

Meanwhile, Cropin, a Bengaluru-based agri-tech firm that provides artificial intelligence and machine learning-based solutions in the agriculture sector, will conduct a pilot in six districts of Marathwada and Vidarbha where their AI and machine-learning based platform will first create an inventory of farmers, their farm and crops sown during the coming rabi season. They will use geofencing to identify perimeters of individual farmers' holdings, which means individual farm-

specific data will be collected and analysed. In the 2020 kharif season, the digital platform will be able to provide intelligence in the form of advisories regarding farm-specific crop yields, anticipated risks, etc.

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■ Information is collected from the farms by drones or satellites and then analysed.

■ A simple satellite image or drone photograph can correlate to millions of data points.

■ Using algorithms and machine learning, these data points help farmers in selecting crops and timing

the application of insecticide, fertiliser, etc.

■ Aggregated on a wider scale, this data can inform policymakers to finalise procurement and warehousing requirements etc.

■ Over time, analysis of this data can improve India's farm-related policies like MGNREGA etc.

Cropin, which has been in the agri tech industry for nine years, says it has worked with close to 2.1 million farmers across 46 countries and 5.5 million hectares of farm land, analysing 3,500 varieties of 365 crops, all this experience accumulating trillions of datasets that the company uses to inform its artificial intelligence and machine learning platforms. “Using these datasets, we can begin to tell you the health of the crop and likely yield, through various indices we have developed,” said Jitesh Shah, Cropin’s Chief Revenue Officer. Based on different leaf signatures, a crop is identified. Other indices that Cropin has developed include chlorophyll index, evapotranspiration index, etc. Combined with information such as the time of the year, weather, moisture stress, etc, it is possible to develop farm-specific intelligence on acreage, health and yield. Then, agglomerating data from individual geofenced farms, it will be possible to generate regional or taluka-specific or village-specific advisories too. Using algorithms to study vegetation or moisture and other indices periodically, water budgeting models can also be built in the next stage.

Senior officials said the Maha Agri Tech pilot studies are key for long-term risk mitigation in agriculture in Maharashtra, which has remained highly vulnerable to changes in weather patterns on account of a very low percentage of farmland being covered by canal irrigation systems. “The concept is to tie up with various agencies to build a single digital platform for farmers and the government,” said state Agriculture Commissioner Suhas Diwase. He said a GIS-based platform using algorithms and data analytics based on the satellite imagery will help monitor farmland during drought-like conditions too. “Phase One of Maha Agri Tech is done. In Phase Two, we are expanding the scope and also validating ground truths to verify data.”

Future modules will assess market conditions including commodity-wise demand-supply analysis, location of warehousing facilities and also location-specific fertiliser or other input requirements. Other government schemes including soil health cards, ground water analysis, watershed planning, etc may also be integrated with the digital system.

Source: <https://indianexpress.com/article/india/satellite-imagery-artificial-intelligence-to-improve-farm-yields-in-maharashtra-6056933/>