



SpecX assesses agroproducts quickly using scientific parameters such as protein, moisture, SNF and curcumin levels.

# AgNext and Esri India's Data Solutions for an Efficient Agri-value Chain

India's agricultural productivity has for long been hobbled by the fragmentation of land holdings. Since 2018, the Government of India has promoted contract farming as part of policy. This aims to mitigate price risk and market uncertainties through advance agreements, encourage the entry of private players into the farm sector, and foster a culture of precision agriculture.

In the same year, India's Vice President, Mr. M. Venkaiah Naidu, also reaffirmed that precision agriculture was an extremely vital strategy in the country's second Green Revolution, actively

promoted via schemes such as PMKSY (Per Drop More Crop) and the Model Act on Contract Farming.

However, 8 in 10 Indian agriculturists are classified as "small farmers", owning up to only 2 hectares of land. In this highly non-standardised environment of cultivation, it has been a daunting task to leverage collectivisation, from pre-production to post-harvest marketing.

AgNext has been quick to realise that the agricultural value chain provides fertile first-market-opportunities for many advanced

technologies that can ensure quality and precision in farming, and gain remunerative prices for the farmer.

## ABOUT AgNext

AgNext is an agricultural sensing and solutions company, and a recipient of many national-level awards, including the accelerator programme of NAARM and CIIE; Incubation, at IIT Kharagpur; and Best Upcoming Startup Award by Assocham, India. AgNext aims at data solutions to raise efficiency across the agricultural supply chain.



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**Manik Verma**, Business Officer, AgNext

The significant size of the geographies to be covered was a major factor in AgNext choosing the Esri platform. Mr. Manik Verma, Business Officer at AgNext, said: “Esri’s platform has enabled us to develop the whole ecosystem, making it possible to easily assess the large quantity of data generated per farmer. We have started building quality maps for different commodities to understand what quality of produce comes from which areas in India. Currently, actions in agriculture are highly diffused. This centralised data could therefore help in policy making.”

In collaboration with Esri India, AgNext has developed unique solutions for spectral and temporal analysis solutions. As a network partner, Esri collaborates with AgNext on a day-to-day basis to troubleshoot technical issues in real-time. These solutions leverage Esri’s Science

of “Where”, and append them to AgNext’s Sciences of “What” and “When”.

### SPECX: THE SCIENCE OF WHAT

SpecX is a nifty hand-held device that combines computer vision with spectroscopy to accurately assess the chemical and physical parameters of an agro-commodity. The quality of produce is assessed quickly using scientific parameters such as protein, moisture, SNF, and curcumin levels.

Lack of a portable quality assessment solution often leads to trader-driven prices in the market. SpecX provides accurate results over the mobile phone. This portability is enhanced by an individual API that connects and transmits information to a centralised larger-level database. The device connects to AgNext’s

server through ArcGIS’s remotely accessible geo-event server; AgNext’s server is then used as a data point. This feature has since become a USP for the company.

SpecX is currently being implemented successfully for assaying at eNAM mandis. Additionally, the technology solution is widely used by commodity exchange companies, warehousing corporations, agro-processing companies etc.

### SENSENEXT: THE SCIENCE OF WHEN

SenseNext is a suite of IoT sensors employed by agri-businesses and warehousing corporations for real-time monitoring of farm land. Deviations from quality and disruptions in the agri-value chain are identified on a real-time basis and communicated to various stakeholders through Esri’s

## Benefits

- Fulfils market demand for a rapid quality-assessment device that is portable; the SpecX arsenal has been employed against food adulteration, especially in areas such as Haryana, where 70% of milk was reported adulterated.
- SpecX requires minimal technical expertise and functions predominantly as a point-and-shoot device.
- Rapid quality assessment and uploading to a centralised database (via APIs) provide farmers with direct market linkage. This increases their bargaining power and price realisation.
- In e-procurement and e-warehousing market models, SpecX helps reduce intermediaries and puts farmers in charge of their produce and its value. It allows farmers to access markets facing a glut in certain crops, and prevents distress sale within a particular area.
- In future, SpecX could find use in service-level benchmarking, allowing farmers to invest more efficiently in production, and B2B agri-food businesses to improve bulk procurement of agri-commodities.



SpecX is widely used by commodity exchange companies, warehousing corporations, and agro-processing companies to verify the quality of produce.

dashboard and periodic alerts over the smartphone.

Mr. Manik Verma reiterates how the Esri dashboard was a crucial pivot in the entire solution, since “creating separate dashboards for a start-up like AgNext would not have been an easy task”. Esri’s dashboard was dynamic enough to allow AgNext to push through various mobile apps and widgets. This flexibility aided widget development that was specifically iterated to suit the AgNext clientele.

Combined, AgNext and Esri provide a formidable digital platform through which growers and food processors can improve the efficiency of cropping, monitor quality of agro-commodities, improve market access for farmers, and reduce market intermediaries. ■

## Benefits

- SenseNext continuously relays data from farms to key stakeholders, allowing for quality control in cropping, harvest, and post-harvest management.
- It works as a simple plug-and-play IoT solution that delivers data instantaneously upon installation.
- Scientific cropping – as required to ensure fine leaf count for tea, for example – is ensured.
- The efficiency of post-harvest quality management – especially for temperature-sensitive agri-commodities like milk – is scientifically ensured.
- Immediate alerts about storage deviations that can lead to deterioration of quality in the agri-value chain help rectify issues immediately; they also provide a scientific basis for valuation of agri-commodities.
- The solution has found widespread application in plantation agriculture, especially in tea and other cash crops, where one-on-one evaluation of crop quality is time consuming and man-power intensive. Companies have implemented SenseNext, in tandem with SpecX, in various stages of its contract farming programme.
- The solution is being implemented successfully at cold stores, chillers, refrigerators etc. for agri-food businesses to continuously monitor deviations from optimum parameters. Alerts are sent through email and SMS in case of deviations that may lead to degradation of quality.