

# Big Data Analytics for Agriculture – Scope and Future

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Agriculture sector forms the basis of economic growth of India at large. Agriculture products feed humans to survive. Today, this back-bone is getting affected either due to climate changes, lack-of-interest among farmers, labour shortage, globalization, industrialization or migration of farmers from villages to cities etc. On the other hand, it is required to increase the rate of production of crops to meet the significant growth in the demand arising due to increase in population. Imagine a day, as a result, where farmers could not produce or harvest, which could affect the entire eco system and such a situation looks to be closer than expected. In contrast, in the current scenario, there is a requirement to increase the production in order to meet the increasing population given the constraint of shortage of fertile land. With technology, we can instil confidence in farmers and support them to get better yield and make it profitable so that farming activity continues as expected.

Big Data and Analytics is one such promising technological support system for agriculture domain that promises timely inputs to farmers on weather forecasting, irrigation practices, plant nutrient requirements, soil capabilities, crop selection, market demand, etc. In the field of agriculture, big data is considered to be a blend of technology and analytics that can assemble the required data and analyse them to process it in more informative and appropriate manner to help the farmers in decision making.

Big data combined with cloud supported apps can further direct the farmers precisely on how to balance their harvest in line with market demand and enhance their produce and thus maximize their profits. This technology enables the farmers to micromanage farming and its associated activities. The beauty of this technology is that farmers can gain insights and estimate their yield even before actual planting of crops. In this article let us try to find ways to boost agriculture produce with the support of cloud, big data and analytics.

## Role of Big Data Analysis in Agriculture

Application of new and emerging technologies is need of the hour in agriculture sector. In this direction, many established organizations and upcoming companies are coming forward to lend required support [1]. There is a definite need for Big Data in the agricultural sector as it has made significant advancement in the fields of IT, healthcare, education, sports

etc. [2]. While majority of farmers could maintain and increase soil health through traditional and conservative practices, technology assisted tools might be influential in ensuring a viable farming for future. Data analysis tools can help determine if the changes incorporated in the traditional agricultural patterns will give the same or better yield to meet the increasing food demands of the

population which is growing significantly while at the same time preserving the necessary natural resources. The final outcome of agricultural data analytics is to analyse and propose workable solutions with enhanced yield and outcomes. For instance, an image of an area of a land taken by the satellite has many levels of data giving us sensible information to analyse.

### Scope and Effect of Big Data in Agriculture

Accomplishment in the farming domain has been fundamentally reliant on natural forces and resources, but not anymore in future [3]. Technological evolutions and services such as IoT, big data, analytics and cloud computing are emerging as tools to counter the ill-effects of climate changes, global warming and to meet the increasing demand for food. IoT devices facilitate the direct and real-time data collection from the ground through sensors plugged in crop fields, soil and plants. Data analysts can integrate these large and real-time data collected along with other significant information accessible from the cloud, such as climate data and pricing models to identify the patterns. These identified patterns and insights help in monitoring the situation. They assist to identify prevailing concerns, like functional inadequacies and issues with the quality of the soil and develop predictive algorithms which can alert the occurrence of a problem. It is estimated that with adoption of analytics, the agriculture output can grow consistently with an annual compounded growth rate of 16% [4]. Thus big data, can surely revolutionise the agricultural sector, along with cloud based system coupled with appropriate tools and software to integrate data sources for making good decisions.

### Advantages of Data Analysis in Agriculture

1. Data analysis facilitates farmers, seed companies, insurance agencies, bankers, fertiliser industries, machinery industry etc. with right input at right time for better outcomes.
2. Data analysis provides better awareness, more precise knowledge



Fig. 1 : The precision farming in place at Israel [6] - Samples

and helps to bridge the gaps in the supply chain market of the agriculture industry.

3. The agriculture industry will be guided with abundant information for more informed decision making.
4. Scope for developing new seed patterns and behaviors with access to the plant genome and new methods to quantify the same.
5. New era of precision farming can boom with Big Data. The outcomes of analytics, perceptions and better results can then be used through precision farming methods as shown in Figure 1.
6. Scope for Food tracking with the aid of sensors and analytics to prevent damage leading to wastage and food-borne diseases.
7. Significant impact on supply chain of seed, crop inputs and food.

At present, the big data technology is in its nascent days and the potential for it create value addition is still a probable figure in agriculture sector. But it has put the industries on the pavement of creating a disruptive innovation. Countries like Israel have been using this data analytics and

significant improvements in the farming sector are observed, as a result. Stakeholders with an urge to innovate new things will be the first ones to reap greater rewards in this direction. GODAN (Global Open Data for Agriculture and Nutrition) framework aims at bringing all the stakeholders together to leverage technology and solve global problems in agriculture industry [5].

The authors are hopeful of seeing this revolution happening in Indian agriculture sector for the benefit of its farmers, economy growth and survival of human race.

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