

Big Data: Impact, Utility, Role and Advantages In Today's Agriculture

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What it is and why it matters

Big data is a term which describes large, hard-to-manage volumes of data in structured and unstructured form of data on a day-to-day basis. It refers to the data that is so large, fast or complex and which is so difficult or impossible to process using traditional methods. Big data store and access a large amount of information for a very longer period of time.

Why is big data important?

The importance of big data doesn't simply revolve around how much data you have but how can use such data on large scale. By taking data from any source and analyzing then it gives a streamline resource management, improve operational efficiencies, optimize product development, drive new revenue and growth opportunities and enable smart decision making.

The impact of big data in agriculture:

Technological revolution that is currently happening in the agricultural sector became possible, among other things, due to big data. Collecting and analyzing big data can not only improve the productivity of individual farms but also help halt a global food crisis. The significance of this lies in the growing need to produce more food while using less land for it. To reach this goal, policymakers and industry leaders seek assistance from technological innovations, including big data, IoT, analytics, and cloud computing.

Big data; Practical Utility in Agriculture

Meeting the food demand

Big data provides information to the farmers about the changes in weather, rainfall, water cycles, fertilizer requirements, soil moisture and other factors which affect the crop yield. With all this data and information, the farmers are able to make accurate and reliable



decisions, ultimately helps in improving farm yields. And this is the best way to satisfy the growing food demand without using more land along with efficient using of available resources with the purpose to increase crop yields.

Pesticides use optimization

Use of pesticides now a day's considered as a problematic issue due to its side effects on the ecosystem. Big data provides an opportunity for smart and precise application of pesticides, which helps the farmer to make smart decisions on what pesticide to apply, when, where and by how much. Such monitoring helps food producers to avoid the overuse of toxic chemicals. Besides, it increases farmers' profits by reducing costs on unnecessary use of pesticides.

Management of farm equipments:

It helps large farms to reduce costs by remote management of agricultural machinery. Big data can easily process and analyze streams of data which is retrieved by a variety of sensors, varying from satellites to farming equipments, growers can remotely track their machinery in the field, ultimately eliminating all the unnecessary routes, considerably lowering spendings on fuel also.

Management of problems in supply chain

Big data helps to achieve supply chain efficiencies by tracking and optimizing delivery truck routes. As a result, food delivery cycles, from producer to the market, become much shorter, ensuring no food is wasted in the process.

Yield prediction

Yield prediction insinuates the use of technology and different algorithms to analyse information on chemicals, weather, vegetation, and many more with the aim of improving decision-making by farmers. Different technologies help farmers to easily decide on where and when to plant seeds, how to space them, when to water, apply chemicals, and when to harvest. This significantly minimizes the need for manual work by collecting online information which is easily available through big data.

Role of data analysis in agriculture:

To sustain yield potential within improved varieties and meet food demands of a growing population without harming natural resources, making additional changes and data tools can help determine what these changes should be. The final result after collecting data is



to analyse it and come up with actionable solutions with better results. For example, a satellite image of a plot of land has several layers of data embedded into a single spectrum giving us a tonne of information to analyze. The geospatial approach and satellite monitoring of farms will provide informations to the farmers for better decision

Advantages of data analysis in agriculture

Informative data helps debt-laden farmers, insurance agencies, loan banks, seed companies, machine industry and every big and small player. Data analysis not only provides accurate knowledge, creates greater awareness, but also helps in to plug the lacunae between supply chain and marketing demand of the industry.

- Predicting climate conditions and enabling weather forecasting by satellites and devices on aerial and ground levels.
- By using RFID tracking system growers are able to monitor and evaluate the supply chain.
- The installed machines and sensors helps to analyze different kinds of soil and fertility status of soil that will predict which seeds and fertilizers are use.
- The aerial vehicles viz. drones provide the accurate information regarding potential diseases by analysis crop and also preventing the spoilage of crop.
- Integrating information like conditions of weather, soil types, and market opportunities, farmers can increase the crop yield by optimizing the resource use.
- It minimizes the expenditure on agriculture.
- It ensure maximum satisfaction of consumers.