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Precision Agriculture

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The use of technology and data-driven strategies in agricultural practices is referred to as artificial agriculture, also referred to as precision agriculture or smart farming. It uses sensors, robotics, satellite imaging, and data analytics to improve farm management and crop yield while reducing resource inputs. Following are some pertinent details and sources about artificial agriculture:

Remote Sensing and Satellite Imagery:

A vital source of information on crop health, soil moisture, and nutrient content is provided through satellite photography and remote sensing technologies. Farmers can use this information to make well-informed decisions about irrigation, fertilizer use, and insect control.

Sensor Technology:

Soil conditions, crop growth, and environmental factors are tracked using a variety of sensors, including moisture sensors, pH sensors, and nutrient sensors. Farmers can detect early signs of plant stress and improve watering schedules and nutrient application using sensor data.

Precision Irrigation:

To maximize water usage, artificial agriculture uses methods including drip irrigation, micro-sprinklers, and variable-rate irrigation. In order to give the proper amount of water to crops and reduce water wastage, soil moisture sensors and weather data are used.

Autonomous Robotics and Farm Machinery:

For operations including planting, harvesting, and crop monitoring, artificial agriculture uses robotics and autonomous technology. These innovations increase productivity, lower labor costs, and enable accurate operations.

Data Analytics and Decision Support Systems:

To handle and interpret huge volumes of data gathered from multiple sources, artificial agriculture relies on data analytics and decision support systems. Farmers can estimate production, optimize inputs, and make wise management decisions with the aid of advanced analytics.

Precision agriculture under climate change scenario

Addressing the problems brought on by climate change requires precision agriculture. It provides a variety of tools and techniques that can assist farmers in adjusting to shifting environmental conditions while enhancing the efficiency and sustainability of agricultural production.

Resource Efficiency:

By customizing treatments to the unique requirements of crops, precision agriculture helps to maximize the use of resources like water, fertilizer, and pesticides. This lessens waste generation and adverse environmental effects. For instance, sensors and data analytics can improve irrigation water management and increase its effectiveness (Sui et al., 2020).

Climate-Resilient Crop Selection:

Growing circumstances are changing as a result of climate change. Farmers can choose crops that are better suited to the changing climate with the aid of precision agriculture. Which crops would survive under the new conditions can be determined by remote sensing and data analysis (Lobell et al., 2019).

Predictive analytics and weather monitoring:

Precision agriculture makes decisions in real time using information from a variety of sources, such as weather forecasts and past climate data. It enables farmers to modify their methods in response to expected climatic conditions. The effects of extreme weather occurrences are lessened with the aid of these methods (Sawicka, 2016).

Soil health and carbon sequestration:

Precision agriculture techniques like cover cropping and no-till farming enhance soil health and can absorb carbon, reducing the consequences of climate change. These procedures aid in lowering agricultural greenhouse gas emissions (Cavigelli et al., 2005).

Cutting Emissions:

Precision agriculture techniques cut emissions by maximizing the use of equipment and fuel. Greenhouse gas emissions can be reduced by cutting back on pointless field trips and utilizing autonomous equipment (Mamo et al., 2018).

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