ARTIFICIAL INTELLIGENCE (AI) IN AGRICULTURE IS EXPECTED TO INCREASE DRAMATICALLY

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Food waste, climate change, and other issues lead approximately one billion people to remain hungry and malnourished even though the globe produces enough food to feed everyone. And with 9.7 billion people expected to inhabit the planet by 2050, the agriculture sector is under increasing pressure to provide food with less resource use and less environmental effect. Thankfully, the application of artificial intelligence (AI) in agriculture has promise for revolutionizing food systems and mitigating the world food issue.

AI can assist farmers in making data-driven choices, optimizing resource consumption, and minimizing environmental effect by analyzing data from several sources. According to a World Economic Forum analysis, integrating AI into agriculture might result in a 60% reduction in the use of pesticides and a 50% reduction in water usage. Market demand analysis is an essential component of contemporary agriculture. In addition to analyzing meteorological data and satellite photos, AI can assist farmers in choosing the best crop to produce or sell and offer insightful advice on when to plant and what kind of crop to grow. It is possible to forecast market demand for certain crops while optimizing profitability by examining data patterns. Farmers may reduce the likelihood of crop failures by using forecasting and predictive analytics. This will create software applications that analyze fruits and vegetables and offer information on their quality, freshness, and size using artificial intelligence (AI) and computer vision methods. In addition to identifying flaws and illnesses in crops, these AI technologies allow farmers to take preventative action before the crops are impacted.

Artificial Intelligence (AI) can assist in the production of crops that are more weather and disease adapted by gathering data on plant growth. Scientists can use AI to find the best-performing plant kinds and crossbreed them to make even more superior hybrids. AI systems are capable of reliably estimating missing nutrients and performing chemical soil analysis. One of their products, Nutrient Scanner, gathers information from soil samples and gives farmers precise estimations of the nutrients that are lacking and the general condition of the soil. This enables farmers to optimize crop growth and minimize environmental impact by

modifying irrigation schedules and fertilizer applications.

AI can monitor the state of plants to spot and predict diseases, identify and remove weeds, and recommend effective treatment of pests. It can also suggest the most effective treatment for pests, reducing the need for broad-spectrum insecticides that can harm beneficial insects and lead to pesticide resistance. Farmers find it difficult and time-consuming to estimate crop growth and maturity, but AI can complete the work accurately and swiftly. Farmers are able to accurately forecast when crops will achieve ideal maturity by monitoring and tracking crop changes with the use of AI-powered gear, such as sensors and image recognition tools. According to studies, the accuracy rate attained by employing AI to forecast crop maturity was greater than that of human observers. Farmers may benefit from large cost savings and better revenues as a result of this improved precision. Farmers can precisely track the amount of water and nutrients in the soil by integrating sensors and AI systems. Deploying devices that detect several factors such as temperature, pH levels, nutrient content, and soil moisture might be part of the sensor-based soil monitoring process. These sensors relay data back to AI systems, which process it, evaluate it, and advise farmers on the best ways to handle their crops in light of the soil conditions they have discovered.

AI-powered technologies can help farmers identify plant illnesses and insects faster than people can. For instance, an AI-powered system might identify an aphid infestation on a strawberry field, transmit the information back to the farmer's Smartphone, and then recommend the best course of action. Through a linked sprayer, the device could even automate the spraying of pesticides if necessary.

AI technology can be used to automate insect or weed control. Robotic weeding is supposed to be extraordinarily accurate with the use of computer vision, saving 90% of pesticide use. These solutions use data analytics to determine how much pesticide is required for each field based on information about crop type, soil condition, and field history. In the upcoming years, artificial intelligence (AI) in agriculture is expected to increase dramatically since it has the ability to completely transform the industry by boosting efficiency, decreasing waste, and raising crop yields. The market for AI in agriculture is likely to develop rapidly, with a Compound Annual Growth Rate (CAGR) of 35.6% expected to see the market size rise from $2.35 billion in 2020 to $10.83 billion by 2025, according to a research by Markets and Markets. This will lead to more informed decision-making and improved crop yields, essential for addressing the global food security challenge.

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