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Use of artificial intelligence for precision agriculture in Bangladesh

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A B S T R A C T

The world's most densely populated country is Bangladesh, and the population growth rate is 1.04 percent per annum. In this regard, crop production must increase by 2-3% per year for 238 million people by 2050 to address Bangladesh's continuously declining (0.29 percent per year) agricultural land. Drastic climate change, decreasing arable land, soil-water degradation due to heavy use of fertilizers, pesticides, industrial wastes, reduction of soil fertility and water table, etc., are the reasons for decreasing food production rates. The conventional method of crop husbandry is not sufficient to meet the food demand, despite the intensifying of input resources for crop production in Bangladesh. In this regard, IoT, ML, and AI technologies are effective tools for successful artificial intelligence-based precision agriculture. Precision agriculture increases crop yield by 22.46% more than imprecision agriculture. The AI-based technologies, viz., robotics, drones, GPS, remote sensing technologies, and computer imaging, are being used to predict the incidence of diseases and insect pests, weather forecasts, time of application and optimum dose of fertilizers and pesticides, irrigation scheduling, time of produce harvest, and predictive agricultural analytics, markets, and supply chain efficiency for economic, social, and environmental prosperity. AI-based technologies are alternative ways of traditional practice to ensure food security and a quality environment in Bangladesh by overcoming AI drawbacks.