



Advancement in Controlled Environment Agriculture (CEA) Automation and Crop Management

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Deadline for manuscript
submissions:

31 October 2024

Message from the Guest Editors

Rapid climate change, urbanization, decreasing soil fertility, resource wastage and environmental degradation pose significant global challenges. Controlled Environment Agriculture (CEA) has the potential to minimize these problems by enhancing nutrition security, reducing the carbon footprint and increasing resource use efficiency. Automation technologies have evolved to encompass a wide spectrum of tasks, ranging from environmental control to precise resource allocation. Through the integration of sensors, robotics and smart control systems, CEA facilities can optimize conditions, such as temperature, humidity, CO₂ levels, light and nutrients, thereby creating an ideal environment for plant growth, which not only enhances crop quality and quantity, but also contributes to environmental sustainability by minimizing waste.

In tandem with automation, there has been a significant transformation in crop management through the integration of data-driven insights. Advanced analytics and machine learning algorithms analyze a multitude of factors, including plant health, growth patterns and historical data, thereby empowering farmers with actionable intelligence.





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