

## AGRICULTURAL ROBOTICS: THE REVOLUTION OF ROBOTICS IN AGRICULTURE

Shankar Rajpoot<sup>1\*</sup>, Shubham Gangwar<sup>1</sup>, Rohit kumar<sup>1</sup>, Somdutt Tripathi<sup>2</sup>, Chhatrapal<sup>3</sup>

### Introduction:

The integration of cutting-edge technology is bringing about a dramatic revolution in farming, one of the oldest professions in human history. Previously a sci-fi idea, agricultural robotics is now a reality with the potential to completely change how we grow food. This essay will examine the exciting field of agricultural robots and how it is transforming the agricultural industry.

### The Increasing Demand for Innovative Agriculture

The demand on agriculture to feed the world's growing population is rising at an exponential rate. Farmers are using technology to overcome this challenge, and robots are a key component of this change.

**1) Precision Farming:** Agricultural robots are made to carry out duties with extraordinary accuracy. For example, they can minimize waste when planting seeds, applying fertilizer, and even harvesting crops. Precision farming minimizes the negative effects of agriculture on the environment while

increasing yields and lowering the demand for hazardous pesticides.

**2) Labor Shortages:** The lack of labor is one of the biggest challenges the agriculture sector is now facing. Robots are filling the void left by individuals who are less inclined to engage in agriculture. They are able to work continuously, decreasing the need for human labor and raising output levels all around.



**3) Sustainable Agriculture:** Robots used in agriculture are good for the environment. Through precise application of resources like water, fertilizer, and pesticides just where required, they contribute to waste reduction and mitigate the adverse

*Shankar Rajpoot<sup>1\*</sup>, Shubham Gangwar<sup>1</sup>, Rohit kumar<sup>1</sup>, Somdutt Tripathi<sup>2</sup>, Chhatrapal<sup>3</sup>*

*<sup>1</sup>Ph.D. Scholar, Department of Post Harvest Technology, BUA&T, Banda (U.P).*

*<sup>2</sup>Ph.D. Scholar, Department of Agricultural Extension, BUA&T, Banda (U.P).*

*<sup>3</sup>P.G. Scholar, Department of Agriculture Entomology, Aligarh Muslim University, Aligarh (U.P.)*

environmental effects of agriculture. This sustainable strategy is essential in light of the changing environment and the escalating worries about food security.

## Types of Agricultural Robots

Agricultural robots are made to do specific tasks and are available in a variety of sizes and designs.

1. **Harvesting Robots:** These robots have unparalleled speed and accuracy when picking fruits and vegetables. They decrease crop damage and the requirement for human pickers.
2. **Autonomous Tractors:** These autonomous vehicles are capable of precise field plow, sowing, and cultivation. They can follow predefined routes and adapt in real time for the best planting conditions.
3. **Weed Control Robots:** Herbicide consumption is decreased because these robots detect and eradicate weeds using artificial intelligence and computer vision.
4. **Drone Technology:** Drones with sensors can be used to treat specific portions of a field with targeted treatments, monitor crops, and evaluate the health of plants.

## Advantages

There are many benefits that robotic technology offers to farmers and the agriculture sector overall. Here are a few main advantages:

- **Increased productivity:** Robots are more productive than human labor because they work tirelessly and effectively. They can complete jobs quickly and precisely, which increases agricultural productivity and farm profitability overall.
- **Reduction in labor costs:** Robotic technologies offer an alternative to human labor, which reduces depend on labor costs. During the busiest farming seasons, robots can work nonstop without becoming tired, negating the need for extra labor.
- **Sustainability and energy efficiency:** Robotic technologies optimize resource utilization to minimize environmental impact and promote sustainable farming methods. Farmers may reduce their carbon footprint without sacrificing output by using less water, insecticides, and herbicides.
- **Precise data-driven decisions:** Farmers are able to make educated judgments by analyzing the massive volumes of data generated by robotic technologies. This data-driven strategy aids in maximizing profitability, minimizing resource waste, and optimizing farming operations.
- **Enhanced farming techniques:** Farmers can now use sophisticated farming methods including precision and vertical farming thanks to robotic technologies. In a world with finite arable land, these

methods maximize resource allocation, minimize land usage, and create opportunities for urban agriculture, all of which support sustainable food production.

### **Disadvantages**

The cost of manufacturing or purchasing a robot is high, their upkeep is necessary, farmers may lose their jobs, the robots have the potential to alter agriculture's cultural and emotional appeal, and energy concerns are expensive.

### **Conclusion**

The use of agricultural robotics is revolutionizing farming, increasing productivity, sustainability, and efficiency. Instead than taking the place of farmers, these innovative machines are enabling them to feed a burgeoning global population while having a less negative environmental impact. In order to solve some of the most important problems of our day, technology and agriculture will need to work together in the future. The world of agriculture is experiencing exciting times as the era of smart farming approaches.