SUNSHINE AGRICULTURE
e-Newsletter

**ISSN (E): 2583 – 0821**

*Sun. Agri.:e-Newsletter*, (2022) *2*(1), 7-10

Article ID: 108

# Automation Agriculture/Agriculture Technology

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Open Access

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*Available online at*
www.sunshineagriculture.vitalbiotech.org

**Article History**
Received: 22. 12.2021
Revised: 29. 12.2021
Accepted: 10. 01.2022



## INTRODUCTION

Technology is an application of scientific knowledge in various daily activities. It is the result of interactions among man and nature and their evolution in different times of history. There is a gradual change in agriculture over centuries from pre-agriculture phase (Age of Hunting and Gathering) to traditional agricultureto Green Revolution phase in Late 90's and then to attempts of sustainable agriculture initiatives. Due to over growing population there is a urgent need of smart farming since land holding by farmer is decreasing day by day due to industrialization, increased cost of inputs and decreased yield, unavailability of labours, changing priorities of humans call for smart farming.

Smart Agriculture is new era of agriculture farming system which helps in automated farming with the collection of data for further analysis to provide the operator with accurate information for better decision making to gain high quality output of product. Smart farming tools introduce a new level of technology into agriculture including robotics, drones, sensors, data computation and analysis which reduces the risk of labourproblem,provides precision agriculture and enhances efficiency.

**Objectives of Automation Agriculture:**

Development in agriculture technology results in sustainable ecosystem and food security with minimum impact on environment and minimal disturbance to existing agricultural practices. The goal of automation is not to get rid of labours, but to make farmers work hassle free. Automation Agriculture offers the following benefits:

1. Reduces time and cost of cultivation
2. Reduced use of inputs like fertilizers, seed material etc.
3. Ensures target specific application of chemicals there by reduced impact on environment
4. Reduces the chemical run-off into river system
5. Reduces the error of mixing chemical concentrations
6. No labour issues

1. Accuracy and precision is obtained which is helpful in research areas
2. Larger areas are monitored easily without difficulty.
3. Increase in yields and rate of production and doubling farmers income.

**Role of agriculture technology:**

Automation Agriculture plays a major role from food production to consumers. Technology development has transformed many operations from manual to automation like ploughing of fields with bullocks to tractors, machinery for sowing planting, weeding, fertilizer pesticide application, irrigation, harvesting and processing at large scale industries and to consumers reach everything is automated now-a-days. Innovation of technologies like drones, nano technology, automation in green house, sensor devices, robotics artificial intelligence are booming in market which are making lives more easier. Consumer'sbenefit from the automation since products reaches consumers fresh, faster and more sustainably.

Drones can be used to monitor conditions remotely and even apply fertilizers, pesticides and other treatments effectively without loss and their target specific application ensures environment safety and soil health. Larger areas can be monitored easily with drones since they identify problematic areas and click images and send to the computer so that issues can be diagnosed earlier.

**Figure 1: drones spraying**

Sensors used in the agriculture are known as agriculture sensors. They are installed in drones, robots that provide data which helps farmers to monitor and keep farmers update with the weather changes. Different agriculture sensors are Location sensors, Optical sensors, Electro-Chemical sensors, Mechanical sensors, Dielectric soil moisture sensors, Air flow sensors.

Green house automation functions includes irrigation system along with

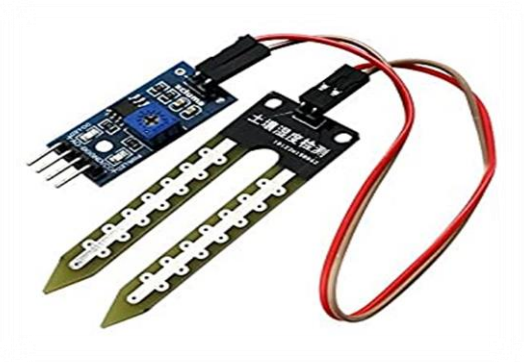

**Figure 2: Soil humidity sensor**

fertigation, controlling internal enviroment like $Co_2$, temperature, moisture levels, light intensity,sensors to monitor how much of fertilizers or water applied to crops ensures accuracy and avoides wastage or loss.

**Figure 3: Automatic irrigation in greenhouse**

**Robotics or artificial intelligence:** a booming technology in agricultureenables more reliable monitoring and management of natural resources like soil and water. Robots are used in various applications in agriculture like cloud sowing, weeding, pesticide application, harvesting, soil analysis etc. reducing labour shortage problems in developed countries.

**Figure 4: Automatic apple harvester**

**Limitations:**

- Cost of implements is higher for a small and marginal farmer to bear
- Lack of knowledge about technology and their working.
- Smart technology technologies require continuous internet activity which is not available in remote areas of country.

## CONCLUSION

Farmers can use the benefits from the technologies in increasing the yields. However smart technologies offering greater efficiency, précised farming, safer growing conditions, lowers prices to consumers. Modern agriculture technology interventions fostering commercial activities and increased family income, creating self employment and lead to rural development.Financial assistance and skill training to be provided to farmers for mounting modern interventions in agriculture.