

Chapter 15

Smart Agricultural Practice for India

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ABSTRACT

The rapid growth of food needs due to the increasing worldwide population is raising the requirement for smart agriculture. Smart agriculture employs superior technologies such as decision support system, expert system, IoT, GPS, machine learning, robotics, and application of connected devices. Smart agriculture supports an automated farming system that includes a collection of data related to the farming area, and then analyzes the data so that the farmer can make the right decisions in order to grow high-quality products. In smart agriculture, farming-related data are collected using some unusual instruments like sensors, cameras, microcontrollers, and actuators. Then the collected data of farming areas are transferred via the internet to the farmer for decision making. This chapter is aimed to discuss critical topics for the implementation of smart agriculture in India.

THE INDIAN AGRICULTURE

Agriculture is the science, art, or manner of cultivating the soil, yielding crops, and keeping livestock and in diversifying scales, the manufacture, and marketing of the resulting products. Agriculture has been connected with the production of essential food crops, at now agriculture more than traditional farming and includes fisheries, dairy, forestry, fruit cultivation, vegetable production, flowers, and medicinal plant growing, poultry, beekeeping, mushroom, etc. The present time agriculture also included processing, marketing, and distribution of field crops and livestock products. Thus, agriculture could be related operation to as the promotion, production, processing, and distribution of farming products. Agriculture plays an essential role in the life cycle of an economy of the nation. Agriculture is the spine of the economic operation of a given nation. In an extension of providing foods and raw materials, agriculture also contributes to employment opportunities for a large number of the population. The notable expectations from agriculture are:

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- Food security
- Source of raw material for industries
- Employment possibilities
- Contribution to national revenue and significance to the international trade

According to Zion Market Research, the global smart agriculture market was USD 5,098 million in the year 2016 and is expected to reach around USD 15,344 million by the end of 2025 increasing at a CAGR of more than 13.09% between 2017 and 2025.

The climate of India is a typical monsoon, and the average annual rainfall of the whole country is approximately 1170 mm but place-to-place it significantly varies. There are 20 agro-ecological zones in India based on characteristics of the soil, physiographic features, bio-climatic features, and the plant growing period length. All characteristics closely correlated with rainfall, so that rainfall acting a critical role in the climate as well as agriculture of India.

Table 1. Drought in India ¹

Year	The Reason of Drought and Its Impact
1837	The short monsoons in the area between Agra, Allahabad, and Delhi.
1866	The monsoon failed in Orissa due to it one million people lost their lives, which was one-third population of Orissa state that time.
1896	Due to the shortage of rains in the south part of Uttar Pradesh, lost of around 7.5 to 10 million people happened.
1899	A drought happened in the western and central part of India due to fewer monsoons, after those prices of foods commodities overgrow.
1943	Four million people in eastern India lost their lives for hunger in the drought.
1966	Due to the shortage of monsoon in Bihar and Orissa, and around 50 million people were affected.
1969	The monsoon failed in Uttar Pradesh, Haryana, Rajasthan, Gujarat, Madhya Pradesh, Tamil Nadu, Andhra Pradesh, and Karnataka, around 15 million people were affected.
1970	The monsoon failed in Rajasthan and Bihar, and around 17.2 million were people affected.
1972	Due to the shortage of rains Himachal Pradesh, Uttar Pradesh and Rajasthan for that around 50 million people were affected.
1979	The short monsoons in and Uttar Pradesh, Punjab, Himachal Pradesh and eastern part of Rajasthan, around 200 million were affected.
1982	The monsoon failed in Punjab, Himachal Pradesh and Rajasthan for that approximately 100 million people were affected.
1983	Due to the shortage of rains in Bihar, Rajasthan, Tamil Nadu, West Bengal, Kerala, Karnataka, and Orissa, and around 100 million people were affected.
1987	Due to the shortage of rains northwestern and eastern parts of India 300 million.
1992	Due to the shortage of rains Rajasthan, Orissa, Gujarat, Bihar, and Madhya Pradesh, a large number of people were affected.
2000	Due to the shortage of rains Andhra Pradesh, Orissa, Rajasthan, Gujarat, and Madhya Pradesh, More than 100 million were affected.
2013	the drought of Maharashtra happened primarily owing to low rainfall from June to September a large number of people were affected.
2015	Due to the shortage of rains drought happened in Maharashtra and it affected around 90 million farmers, which is strict to the population of a european country like Sweden.

¹ Extreme weather events in India in the past 10 years. Retrieved from <https://www.downtoearth.org.in/news/extreme-weather-events-in-india-in-the-past-10-years-46450>

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