Chapter 14
Real–Time Crop Monitoring in Agriculture

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ABSTRACT

In many countries like India, farming is done using indigenous methods. Because of lack of proper knowledge in our farmers, the state of the agricultural sector becomes even more critical. Since the farming methodologies rely mostly on weather forecasts and predictions which might not be foolproof, most often the farmers incur huge losses leading to debts and mass farmer suicides. Adequate soil moisture, soil quality, air quality, and proper irrigation play a major role in the yield of crops, and hence, such factors cannot be overlooked. A major concern now is the exploding population due to which the agricultural supplies are not meeting the ever-increasing demand. The world's population is expected to cross nine billion marks by 2050 due to which the agricultural supply should increase at least by 70% to meet the requirement. To achieve this, it's necessary to monitor the plant growth at all stages starting from sowing until cultivation.

1. INTRODUCTION

In many countries, farming is done using indigenous methods. Because of lack of proper knowledge in farmers, the state of the agricultural sector has become even more critical. Adequate soil moisture, soil quality, air quality and proper irrigation play a key role in the crops harvesting and hence such factors cannot be overlooked. A primary concern now is the exploding population due to which the agricultural

supplies are not meeting the ever-increasing demand (M Suchithra, Asuwini T, Charumathi M C, Ritu N Lal, 2018).

Population of the world's is estimated to cross 9.7 billion by the year 2050 (Le Mouël C., Lattre-Gasquet D., & Mora O, 2018) due to which the agricultural supply should increase at least by 70 percent to meet the requirement (Ranveer Chandra, 2017). To achieve this, it's necessary to monitor the plant growth at all stages starting from sowing till cultivation.

Agriculture experts think about problems of World's food production and the most promising approach is "Data driven agriculture". Data driven agriculture is the ability to map every farm and define it with lots and lots of data. Efficient use of huge data to enhance on farm precision farming is termed as Data driven agriculture. Data driven farming means having the right soil data at the correct time, to conclude the precise decision by the help of which one can improve long term profitability (Brian Hayden, 2015) For example, what remains the soil moisture four inches below the soil in the farm or like what is soil nutrient level throw-out the farm. If one can build a map like this, this could enable technique like precision farming. Precision farming is the ability to do site specific applications. One can understand Precision farming with an example more clearly. Farmers can apply water or pesticides uniformly throw-out the farm, but with Precision farming, can apply it only where it needed. Now farmers will use less water or fewer pesticides and water wastage will be less and also will use fewer pesticides so it will be beneficial for the environment too. Some years before, the implementation of this technology was expensive but with the advancement in technology its cost is lowered significantly (Roy S. & Bandyopadhyay S.,2013). Figure 1 represents the various factors that effects the crops.

Figure 1. Factors affecting the crop.
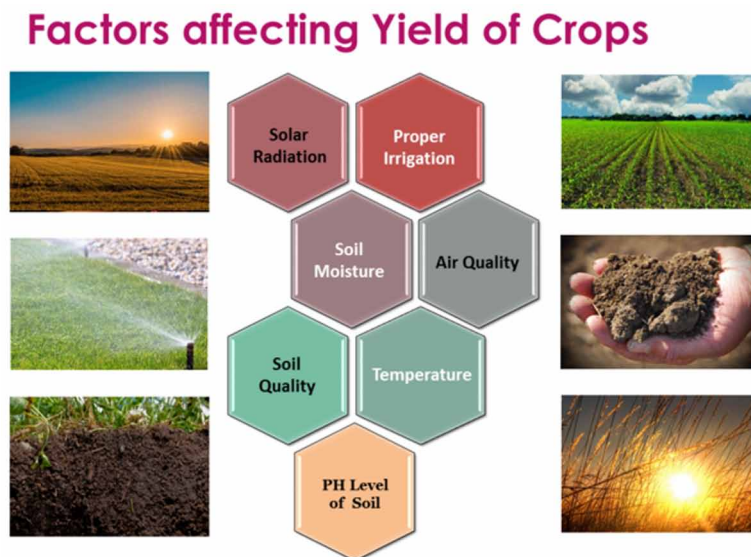
So, with the advancement in technologies, there is possible practical implementation of "Real time crop monitoring in agriculture". Various activities in field like moisture monitoring, water level moni-

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