Chapter 6
An Integrated GIS and Knowledge-Based Automated Decision Support System for Precision Agriculture Using IoT

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ABSTRACT

Agriculture is a sector that holds great promise to Indian economic growth. Production in rural Tamil Nadu is extremely low due to unscientific farming practices. The major challenges faced in Tamil Nadu agriculture are crop mapping, yield prediction, quality of food produced, irrigation management, variable rate fertilizer and pesticide due to lack of technical knowledge. Precision agriculture (PA) rules out all drawbacks of traditional agriculture. The main objective of the chapter is to enhance the productivity of rural Tamil Nadu in order to meet the growing demands of our country's food supply chain

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INTRODUCTION

Agriculture is the art of science for cultivating the soil, producing crops using different preparation methods and technologies and marketing the resultant products produced in the farming. India is an agriculture based country. The farmers are referred as ecosystem engineers as they use many different methods and techniques for increasing the production. It's crucial to maximize agriculture resources in a sustainable manner. This is achieved by continuously monitoring and collecting data of crops and its major factors affecting the productivity of the crop such as weather, soil and air quality, crop maturity. An experimental test bed has to be designed and various types of sensors can be placed throughout the fields which are used to measure the needed parameters (Haider, Rosdiadee, Sadik, Aqeel & Mahamod, 2017).The proposed work adopts different domains like database management systems, Data analytics, Data mining, Internet Of Things, Wireless sensor Networks and Image processing and Artificial Neural Network. The physical real time data can be captured through different sensors and with the help of wireless sensor networks, the data will be uploaded in the cloud. The uploaded data will be properly maintained through database management systems in order to have the well-organized data. Then data mining algorithms will be applied to support the decision making process. During the entire cultivation period, the proper monitoring can be done. Also a recommended system has to be developed to predict future conditions and help farmers to make proactive smart decisions. At the end of harvest, proper evaluation will be done and revision plan will be generated for further improvement.

Objectives of the Work

1. To help the farmers in Rural Tamil Nadu by providing optimized solution for improved agricultural production with the adaptation of Precision Agriculture in order to meet the growing demands of our country's food supply chain.
2. To optimize the inputs for agricultural production with respect to the nature of the agricultural land through Integrated GIS and Knowledge Based Automated Decision Support System in order to maximize the agriculture resources in a sustainable manner.