

INTRODUCTION

1.1 Background to the study

Through the ages agriculture production systems have benefited from the incorporation of technological advances primarily developed for other industries.

The industrial age brought mechanization and synthesized fertilizers, the technological age offered genetic engineering and now the information age brings the potential for Precision Agriculture (Rasher, 2001).

Precision agriculture (PA), satellite farming or Site Specific Crop Management

(SSCM) can be defined as a set of technologies that have helped propel

agriculture into the computerized information-based world, and is designed to

help farmers get greater control over the management of farm operations

(Gandonou, 2005). One of the key technologies of precision agriculture is the control and accurate measurement of the soil moisture. For decades, the subject

of soil moisture has been of great interest in agricultural systems. Prior to

advancement in agriculture, farmers have picked up and felt a handful of soil to

determine the best time to plow his fields and equally to manually determine the

amount of moisture content of the soil. Soil moisture measurement ranges from

the method of feeling the soil to the use of complicated electronic equipment

using radioactive substances. Such method includes the use of soil sensor. Since the inception of precision agriculture, soil sensors have been used to measure the soil moisture level. The soil moisture sensors measure the volumetric water content of the soil by using electrical resistance, dielectric constant, etc. The farmer uses the information obtained from the soil moisture sensor to make adequate and accurate decisions on how and when to irrigate or plough his farmland.

Today, technological progress in communication, along with the information revolution has reduced the amount of work done by the farmer and has since then increased yield. Precision agricultural technologies, such as Global Positioning Systems (GPS), Geographic Information Systems (GIS), remote sensing, yield monitors, and guidance systems for variable rate application, made it possible to manage within-field variation on large scales. The GIS is a software application that is designed to provide the tools to manipulate and display spatial data (Blackmore, 1993). These technologies allow detection and/or characterization of an object, series of objects, or the landscape without having the sensor in physical contact (Viacheslav *et al.*, 2003). General Packet Radio System (GPRS) is a third-generation step toward internet access. GPRS is also known as Global System Mobile Communication Internet Protocol (GSM-IP). GSM-IP keeps the users of this system online, allows to make voice calls, and access internet on-the-go. Even Time Division Multiple Access (TDMA) users benefit from this system as it provides packet radio access. GPRS also permits the network operators to execute an Internet Protocol (IP) based core architecture for

integrated voice and data applications that will continue to be used and expanded for 3G services. GPRS supersedes the wired connections, as this system has simplified access to the packet data networks like the internet. The packet radio principle is employed by GPRS to transport user data packets in a structured way between GSM mobile stations and external packet data networks. These packets can be directly routed to the packet switched networks from the GPRS mobile stations. In the current versions of GPRS, networks based on the Internet Protocol

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