

# INTRODUCTION

This section of the Precision Farming course answers the question "What is precision farming?" It will introduce the student to the concept of precision farming, provide a brief historical perspective, and discuss the condition that is driving the development of precision farming. It will consider the potential impact of precision farming on crop production and examine the scope of farming operations that are already being influenced by the rapidly emerging technologies that make precision farming possible.

## **Assigned Reading:**

Please read Chapter 1, "An Introduction to Precision Farming," in *The Precision Farming Guide for Agriculturists*, by Deere & Company.

## **Precision Farming Defined**

In addition to the assigned reading, consider the following statement in order to appreciate the challenge in reaching agreement on the name for a field that is emerging as rapidly as is precision farming. The statement comes from the Second International Conference on Site-Specific Management for Agricultural Systems, held in March 1994 in Minneapolis, Minnesota.

Site-specific crop management (SSCM) refers to a developing agricultural management system that promotes variable management practices within a field according to site or soil conditions. While this technology is only a few years old, various names have been used to describe the concept: farming by soil; farming soil, not fields; farming by the foot; spatially prescriptive farming; computer aided farming; farming by computer; farming by satellite; high-tech sustainable agriculture; soil-specific crop management; site-specific farming; and precision farming. Interest in this emerging concept has been featured in a variety of news media.

There is no broadly accepted definition of SSCM. We proposed the following:

site-specific crop management is an information and technology based agricultural management system to identify, analyze, and manage site-soil spatial and temporal

variability within fields for optimum profitability, sustainability, and protection of the environment.

SSCM employs a system engineering approach to crop production where inputs are made on an "as needed basis," and was made possible by recent innovation in information and technology such as microcomputers, geographic information systems, positioning technologies (Global Positioning System), and automatic control of farm machinery. It is a holistic approach to micro manage spatial and temporal variability in agricultural landscapes based on integrated soil, plant, information, and engineering management technologies as well as economies (Robert *et al*, 1994).

## Study Questions

1. What is precision farming?
2. Why did whole fields become the smallest management units when agriculture became mechanized?
3. What are advantages and disadvantages of using whole fields as the smallest management units?
4. What condition is driving the development of precision farming?
5. Give several examples of crop and/or soil characteristics that change very little over time. Give several examples of characteristics that can fluctuate rapidly.
6. How would variability over time affect precision farming decisions?
7. What is an important factor affecting virtually every decision a farm manager makes?
8. Precision farming can affect both input costs and crop production. In terms of yields and costs, what are three potential outcomes from implementing precision farming?
9. What are three questions that need to be answered to determine whether precision farming is likely to be profitable?
10. What farming inputs are currently applied in a spatially-variable manner?
11. What operations in the typical crop production cycle can use precision farming techniques?
12. Of all these possible uses of precision farming techniques, which is the most logical starting point for a farmer interested in adopting the technology? Why is this the logical starting point?

## Literature Cited

Robert, P. C., R. H. Rust, and W. E. Larson. 1994. Preface p. xiii. In Robert *et al* (ed.) Site-specific management for agricultural systems. American Society of Agronomy, Madison, WI.