Precision water management: current realities, possibilities, and trends

Title: Precision water management: Current realities, possibilities, and trends

Author: Camp Jr, Carl, Sadler, Edward, Evans, Robert

Submitted to: Book Chapter
Publication Type: Book / Chapter
Publication Acceptance Date: 5/1/2002
Publication Date: 9/1/2006


Interpretive Summary:

Precision water management, defined here as site-specific management, is evolving through experiences with various research projects. Four research sites in the USA have modified commercial center pivot and lateral move machines to achieve precision irrigation management. While the objectives at these sites were similar, the approaches and methods for obtaining precision applications were different. Commercial application equipment is not yet available, but a few center pivots in use on commercial farms have been modified for site-specific operation. Whether for research or production, to achieve maximum cost reduction, precision water management systems must be capable of applying water, nutrients, and agro-chemicals. In current systems, nutrients are applied on a site-specific basis via injection of liquid fertilizers into the water stream. Pesticide systems that have a flow path separate from the water (much lower flow rate) are now being introduced commercially to provide precise control of pests. While current systems are more appropriate for larger farms, the principles of precision management can be implemented on smaller farms, but the method of implementation will probably be by system design rather than by dynamic control. For commercial implementation of precision water management technology, economical variable-rate metering devices must be developed and crop response functions for the manageable inputs must be refined for the important crops and soils.

Precision agriculture (PA) or precision farming, is a modern farming management concept using digital techniques to monitor and optimise agricultural production processes. Rather than applying the same amount of fertilisers over an entire agricultural field, or feeding a large animal population with equal amounts of feed, PA will measure variations in conditions within a field and adapt its fertilising or harvesting strategy accordingly. Likewise, it will assess the needs and conditions of individual animals in larger herds and optimise feeding on a per-animal basis. PA methods promise to incr