



Center Pivots: The Future Farm Management Tool

By Dale Heerman

Our future is unknown in the world. Food producers of the world face many challenges everyday. There is a constant need for producers to produce food, use water

researchers and farmers. Precision agriculture is applying the right of amount of inputs (seed, fertilizer, pesticides and water) at the right time and right place

within a field. This technology is dependent on the introduction of many new tools for enhancing the level of management. The advent of global positioning systems (GPS), geographical information

systems (GIS), yield monitors, variable rate seeding, and variable rate fertilizer application equipment are examples of currently available technologies. These tools are moving production agriculture into the information age.

The use of GPS systems and yield monitors on harvest machinery provide data for generating yield maps. These maps are processed with the GIS technology. The GPS is providing the technology for automatic guidance systems for farm tractors and center pivot systems.

As precision agriculture matures, producers will apply water, pesticides and fertilizers variably throughout the growing season. GPS technology will aid in the development of maps specifying the amount of inputs required in various parts of the field. The center pivot system is envisioned to transport the application device for the variable application of both chemicals and water. Controllers on center pivot systems will become much more complex to accept the prescription map for water and chemicals and variably apply the production inputs.

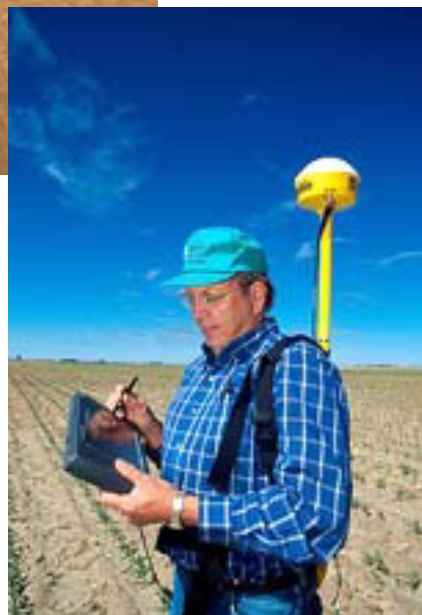
The controllers will also be enhanced with increased data

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efficiently, and maintain a privately owned business in a fluctuating market. Water insurance is a key benefit of center pivot irrigation. Center pivots help meet the challenges and promote the use of precision farming that in turn, leads to water savings.

Precision agriculture is a technology that is receiving attention by industry,



collection. Maps of the actual applied water, fertilizer and pesticides will be generated and document the management practices to meet the objectives of conserving water and limiting water degradation. The control sequences will be programmed from the control panel in the field or from a computer in the farm



office sending the desired operations either by radio or wireless phones. Cell phones are already able to communicate with center pivots to monitor and control the operation status of the center pivot on a real time basis. It is also possible to use the internet to monitor and control an irrigation system. Using the internet a farmer will be able to control his irrigation system from anywhere in the world.

Sensor technology is also being developed that can measure soil water and crop stress. The soil water sensors will



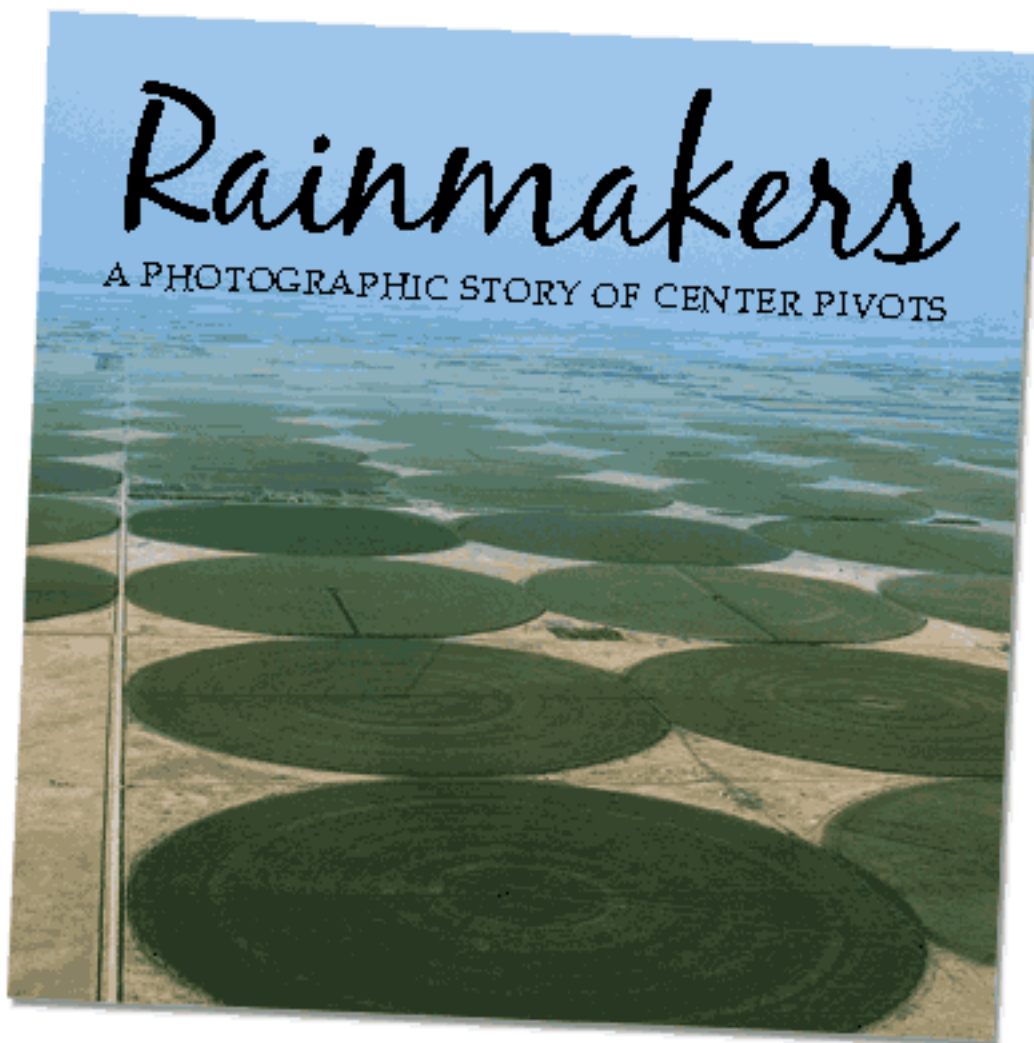
be connected to the irrigation controller to provide feedback to the manager for making more timely decisions of when and how much water to apply. Timing and amounts of fertilizers and pesticides will be based on sensors, mounted on center pivot systems. The specific location in the field will be identified for the timely application of water, fertilizers and pesticides. Precision agriculture and precision irrigation will provide technology for conservation and minimizing pollution.

The new technology and trends for center pivot irrigation will closely parallel the adoption of the tools and technology of the rest of society. It is societal demands and opportunities that will be an integral part of irrigations future. Technological integration and Nano technology are two examples. Very small sensors will sense the various parameters in an irrigated field. The response from these sensors may be read from a central receiver mounted on the center pivot.

The sensors will be able to measure the gases given off by plants which indicate if they are under stress from water, fertility or pest pressure. Plants may be bred to give off different gases that will isolate the type of stress that is occurring. It will be possible to generate real time maps indicating the areas in the field that are suffering from stress.

These maps can be put into a control system and the required input variably applied by the pivot to relieve stress. The next step may be to measure the stresses and interface directly with the controller to apply the necessary inputs on the go as the sensor responses are measured. One can only imagine the many types of information that will be added to the data base which when analyzed will improve management decisions. An increase in quantity and quality of food product is expected to result in more economical food supply and sustainable profits for the farmer.

The future is exciting as new technologies make their way to the market place. The changes in irrigation technology and the continued expansion of center pivot irrigation systems will parallel and fuel additional progress. The result: an ample food supply for a growing world.



"Rainmakers: A Photographic Story of Center Pivots" is available for purchase directly from The Groundwater Foundation and at speciality bookstores nationwide.



The Groundwater Foundation is a nonprofit organization dedicated to educating and motivating people to care for and about groundwater. Contact us at 1-800-858-4844, info@groundwater.org or visit us online at www.groundwater.org.

