

# PRECISION TECHNOLOGY FOR RIGHT NUTRIENT MANAGEMENT

**M**anaging nutrients right – right source, right rate, right time, and right place – may be best accomplished with the right tools. Various technologies are available to aid farmers and their advisers in decisions related to nutrient management, from soil sampling to fertilizer application to yield measurement. Farmers use these tools to enhance their ability to fine-tune nutrient management decisions and develop the right site-specific nutrient management plan for each field. The farmer and the farmer's employees, management and agronomic advisers, and input suppliers all are part of a team, each contributing to the decision process in different ways.

**Right management means site-specific management.** Making decisions on source, rate, timing, and placement with information collected on the specific field helps produce efficient, economical, and environmentally appropriate nutrient management plans. Costs of being wrong are much greater under today's costs for inputs and today's crop prices. That means the price paid for technology to fine-tune those decisions is easier to justify.

**The price for the technology need not be great.** Costs have gone down for many of the tools, so the components of site-specific management technology do not require as much investment. Employing global positioning system (GPS) technology to geo-reference input and yield data is a good first step. Most fertilizer and chemical dealers now have GPS-guided application equipment. Harvesting equipment now comes with GPS as a standard...or easily added...feature. The main system can usually be transferred to planting equipment for collecting geo-referenced planting data, starter fertilizer application, and other inputs. With proper controllers, variable-rate application of inputs can be added to the management plan. Each of these steps can be added over time, increasing the value of the initial investment. GPS guidance helps avoid costly skips and overlaps, saving on input costs for seed, fertilizer, and pesticides. Reduced operator stress and fatigue are major added benefits.

**Geo-referenced records are a key element.** On-board sensors, monitors, and controllers make huge amounts of data available to help farmers and their advisers refine the management system. To best utilize the information collected on the farm, a geographic information system (GIS) is important. GIS is a powerful tool for managing and analyzing large amounts of geo-referenced data...the kinds of data generated by modern agriculture's tools and practices. Decision-support services for farmers, consultants, and input suppliers help interpret the GIS data for better-informed decisions. GIS-based records enable all members of the management team to have access to the details for each field, so that they can help choose the right sources, rates, timing, and placement for best results.

**Early efforts to assemble such a comprehensive, shared data management system had limited success, but there is a resurgence of interest.** The software and communication systems have improved. New outside databases, such as digitized soil surveys and weather information, are now available to complement the farmer's data for use in decision-support tools. More farmers with more data leads toward the "critical mass" of customers needed to sustain a support service offering, either as an independent operation or as an add-on support service offering by an input supplier. Managing and interpreting those data often require outside help. Farmers can glean much more benefit by sharing the data with their adviser partners. Programs being implemented by seed, fertilizer, and chemical companies, or by technology data service providers, may be the answer to the growing information management needs of 21st century farmers...helping them to put the right nutrient source on at the right rate at the right time in the right place.



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International Plant Nutrition Institute  
3500 Parkway Lane, Suite 550  
Norcross, Georgia 30092-2806  
[www.ipni.net](http://www.ipni.net)

A handwritten signature in black ink that reads "Harold F. Reetz, Jr.".

Harold F. Reetz, Jr.  
IPNI Director of External Support and FAR