

Effect of Higher Energy and Fertilizer Prices on Precision Ag Adoption

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Introduction

University and industry researchers gathered in Dayton, Ohio, Jan. 5 & 6 at the annual North Central Regional Education, Extension and Researcher Committee for Site-Specific Management (NCERA180) discussed the latest developments in precision agriculture and the potential for higher energy and fertilizer prices to drive greater adoption of site-specific management.

Until 2005, NCERA180 was known as the North Central Regional Committee on Site-Specific Management, NCR180. Though the title lists it as a “North Central Project”, participation is nationwide. As with the NCR committees before them, NCERA committees provide financing only for communication, chiefly an annual meeting. They do not provide funds for research or extension of the research results. NCERA180 is in the last year of the current five year phase. It has been approved for renewal. The new five year phase will start in September, 2006. The impact statement for NCERA180 can be found at <http://www.nimss.umd.edu/homepages/home.cfm?trackID=2004>.

Twenty six Purdue faculty and staff members participated in site-specific management research in 2005. Faculty belong to five academic departments: Agronomy, Ag Economics, Botany & Plant Pathology, Ag & Biological Engineering, and Horticulture. The Indiana NCERA annual report for 2005 is posted on the Site-Specific Management Center website (www.purdue.edu/ssmc, click on Impact/NCERA180).

Highlights:

- **Fran Pierce**, director of the Center for Precision Agricultural Systems at Washington State University (WSU), described their efforts to build a wireless weather information network for orchards, vineyards and other high value crops. The site-specific weather information is used for decisions on irrigation, frost protection, chemigation, and integrated pest management. Pierce said that the network currently covers about 2 million irrigated acres. Pierce also described a new grape yield monitoring technology which mounts a load cell on the top wire of a grape trellis. The technology can be adapted to any crop grown on trellises. It has the advantage of providing data on hand harvested crops.
- **Tim Stombaugh**, University of Kentucky, presented results on the dynamic accuracy of GPS and the application accuracy of fertilizer spreaders. He noted that most of the application innovations are occurring in Europe where fertilizer is more regulated and consequently farmers are more concerned about accurate application. “In the US manufacturers don’t care about application accuracy,” Stombaugh said, “They say farmers don’t care, so we don’t care.”
- **Eric Lund**, Veris Corporation, described a new lime recommendation software package, Lime Calc, that uses data from the Veris pH soil sensor, lime recommendations from manual samples in the same field and electro-conductivity data to capture the effect of soil texture and CEC. He noted that Veris is working on a slurry approach that would allow in-field testing of nitrate and potassium; the membranes on nitrate and potassium sensors are



too delicate to allow testing directly with soil, as is now done with the pH soil sensor. With the slurry approach it would be possible to add a buffer solution which would permit measurement of buffer pH.

- **Viacheslav Adamchuk**, University of Nebraska, summarized a review of precision agriculture courses in U.S. universities. A description of the survey and results is available at: http://bse.unl.edu/adamchuk/pa_teaching/index.html. His results were based on 18 completed surveys covering 19 courses taught by 17 instructors. Most of the courses are taught by ag engineers (57%) or agronomists (33%). Typically, the students are junior and senior undergraduates. The most common majors of the students are ag engineering, technology or agronomy. Issues with the course include:
 - Should the focus be geographic information systems (GIS) or precision agriculture?
 - Sharing training data would be a potentially useful collaborative effort by NCERA180. Simple, well documented examples of precision agricultural data are scarce.
 - The diversity of agricultural GIS software makes teaching difficult. Which software will be most useful to students when they leave the university?
 - There is no textbook that is entirely appropriate. The most commonly used textbook is the John Deere publication, *The Precision Farming Guide for Agriculturalists*. The Purdue book, *Precision Farming Profitability*, is the second most commonly used book for the courses, but because the courses tend to focus on technical issues, rather than management, only certain chapters are used.
 - How much of the course material and website should be public information?
- **Robert Mullen**, Ohio State University, summarized a research project on optical sensing for nitrogen management with the same protocol implemented at sites in the US, Mexico (at the International Wheat and Maize Research Center – CIMMYT), and Argentina. He noted that “year-to-year variation in nitrogen requirements is more important than spatial variation.”
- The precision agriculture adoption presentation by **Jess Lowenberg-DeBoer**, Purdue University noted that economics favor on-the-go sensing and application, but adoption of such sensors has not been widespread. He noted that the Norsk Hydro N-Sensor had about 320 units in commercial use (as of 2003), N-Tech has between 100 and 200 units in use, and Crop Circle roughly 50 units. He said that the slightly higher adoption of the European N-Sensor technology can be attributed to the subsidy granted to purchasers of the sensor by some European governments.

The group discussed the relatively lower attendance at recent NCERA180 meetings, compared to the 1990s, and the modest participation by industry. Lack of research funding, disappointing adoption of precision agriculture technology and modest profits from site-specific management services and equipment were cited as reasons. Several participants pointed to the higher energy and fertilizer prices as reasons for hope for a renewed interest in site-specific management.

