

Building a Universal Community of Resources and Expertise for Precision Agriculture

by Bruce Erickson

A web-based resource offering the most complete, accurate, and current source of information, education, and advice to advance the understanding and practice of precision agriculture is in the works. An interdisciplinary group met in early December, 2008 to build the framework for this resource. They intend to use the eXtension platform to launch their efforts, hoping to have nearly 50 topics in 10 categories launched by summer, 2009.

As the amount of information available on precision farming continues to grow, it is important that it be well managed and science based. "A number of us have developed some great articles that are scattered amongst our own sites that we maintain," said Kent Shannon, University of Missouri Extension Natural Resource Engineering Specialist. "But with all of the other expectations today in our positions, it is hard for any one of us to keep up with this. It makes sense that we work cooperatively."

eXtension is an interactive learning environment developed as a partnership of the seventy-four 1862 and 1890 U.S. land grant institutions. The eXtension platform is set up so that members of a community of practice work behind the scenes on a private web interface to edit and develop content. After the content passes through the peer review process, it is posted on the eXtension site for anyone to use. At this first meeting, the group felt that the following should guide this effort:

Open to Academics, Business, and Practitioners To keep this effort vibrant this group feels contributions of content should not only include university specialists, but also individuals working in companies providing precision products or services, as well as individuals using precision technologies, such as agricultural retailers and farmers; that it should encompass not only field crops but others such as horticultural crops, vegetables, fruits, nuts, and vines; and it should be international in scope. A code of ethics will be created to address privacy, promotion of self or organization, abuse of influence, and other factors that could impede furthering the knowledge base.

Peer Reviewed for Accuracy and Readability eXtension has a built-in peer review system where the members of the community offer their input to proposed content in a wiki-type environment. Topic leads will also specifically assign proposed articles to at least two subject matter experts for a thorough review/approval. Information will be written using language and style so that it can be utilized by all clients. Additional details regarding peer review, article formatting, and style are part of the internal community of practice process.

Comprehensive and Responsive Eleven major content areas were constructed by the group, and under each of those were placed preliminary topic categories and topic leaders (Table 1). These categories were an initial attempt at delineating and balancing the content, and will undoubtedly change and evolve as this effort and new precision technologies evolve.

A list of several individuals knowledgeable in each topic area to serve as subject matter experts and peer reviewers has been developed--these individuals will be contacted by the initial topic leaders. The eventual topic leaders and subject matter experts will be determined by future members of the community. Anyone with knowledge and experience in precision agriculture can recommend new topic areas and, with the support of their peers, assume a leadership position within this community of practice.



Table 1. Tentative Topic Areas and Topic Leaders for Precision Agriculture on eXtension

Precision Agriculture Basics

Topic Leaders: Raj Khosla, Colorado State University, and Bruce Erickson, Purdue University

GPS and Guidance

Topic Leader: John Nowatzki, North Dakota State University

- Light Bar Guidance
- Levels of GPS Precision
- RTK Networks
- GPS Testing and Benchmarking
- New GPS Technology
- Implement Steering
- Product Comparisons
- CORS Networks

Yield Monitoring and Mapping

Topic Leader: Randy Taylor, Oklahoma State University

- Understanding Yield Data
- Yield History, Calibration, Cleaning
- Displaying Data/Mapping/Legends
- Yield Monitoring of Specialty Crops
- Yield Stability
- Field Comparisons/On-Farm

Remote Sensing for Agriculture

Topic Leader: Keith Morris, Louisiana State University

- Aerial and Satellite Imagery
- Detecting Insects, Weeds, and Diseases with Remote Sensing
- Creating Management Zones with Remote Sensing
- Active vs. Passive Remote Sensing
- Spectral, Spatial, and Temporal Resolution
- Product Comparisons

Soil and Crop Sensing

Topic Leader: Slava Adamchuk, University of Nebraska

- Electrical Conductivity
- Active Optical Sensors
- Proximal Sensing
- pH Mapping
- Ultrasonic Sensors

Field Variability Management

Topic Leader: Raj Khosla, Colorado State University

- Management Zones
- Quantifying Spatial Variability
- Soil Sampling Options
- Topography
- Soil Properties
- Pest Distribution
- Crop Properties

Variable Rate Application

Topic leader: Randy Taylor, Oklahoma State University

- Sensor vs. Map-Based
- Application Methods
- Controllers
- Specifics of Variable Rate for Water, Herbicides, Seeds, Nutrients
- Equipment

Electronics and Control Systems

Topic Leader: Randy Taylor, Oklahoma State University

- Spray Boom and Nozzle Control
- ISOBUS
- Wireless Network Applications in Agriculture
- Telemetry
- Product Comparisons

Precision Agriculture Data Management

Topic Leader: Kent Shannon, University of Missouri

- Data Mining
- Data Compatibility
- Data Interpretation and Correlation

Economics of Precision Agriculture

Topic Leader: Bruce Erickson, Purdue University



Leadership/Organization The Precision Agriculture group will first exist as a part of the Geospatial Technology resource area, <http://www.extension.org/geospatial%20technology>, but intends to create their own resource area once running. The group designated a preliminary overall leadership team: John Nowatzki, North Dakota State University, Randy Taylor, Oklahoma State University, and Bruce Erickson, Purdue University. Sponsors are being solicited, and will be recognized on the site as contributors to this effort. Contributions will fund the time of a person or persons who will add content and oversee the site.

Developing Content The initial population of the site will occur first by examining current content from a variety of sources. Existing articles will be examined through the peer review system, and if suitable may be linked in their existing form. If an existing publication or publications are outdated or otherwise need revision, authors of those publications will be asked to contribute a revised article or articles. Where no suitable publication exists, new publications will be solicited. In addition, members of the community of practice can submit new content for peer review and posting at any time. Some additional features of the effort will include a calendar of events, ask the expert, and notifications of new postings.

Recognition Recognizing contributions to Precision Agriculture on eXtension will be a critical incentive for many contributors who must show scholarly achievement for their advancement. “The peer review setup, as well as the institutional scope of this effort should lend considerable weight to the scholarly consideration of contributed articles,” said Reza Ehsani of the Citrus Research and Education Center, University of Florida.” In addition, the wiki capabilities of eXtension system track individual contributions of review and editing.

We Need Your Leadership The initial group emphasizes that the December meeting was designed to hatch the concept, and hope their peers in precision agriculture—crop producers, business, as well as academics--will join them in further defining this effort. Look for future correspondence about how to join this community of practice, how to contribute your knowledge about precision agriculture, and how to assume leadership in your area of expertise.

