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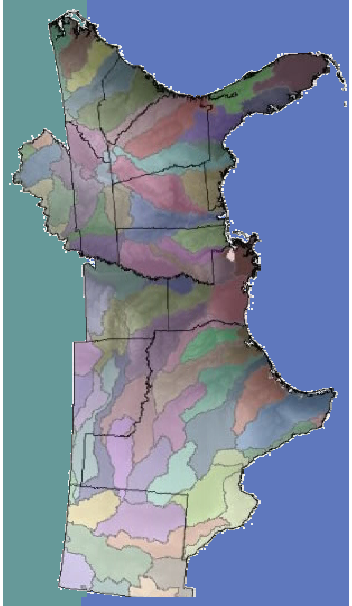
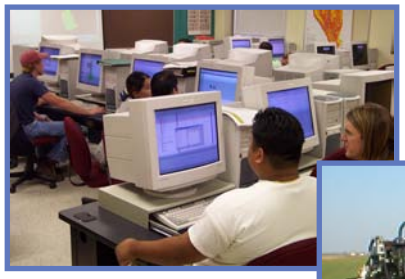
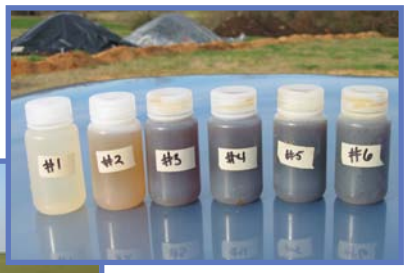


Nutrient Management in the Southern Region

Nutrient management research and education efforts are needed to address major regional problems associated with nutrient losses to surface waters and ground water. The multi-state, multi-agency Nutrient Management Workgroup is prioritizing needs and designing collaborative programs to support coordinated research and development of educational resources.

In This Issue





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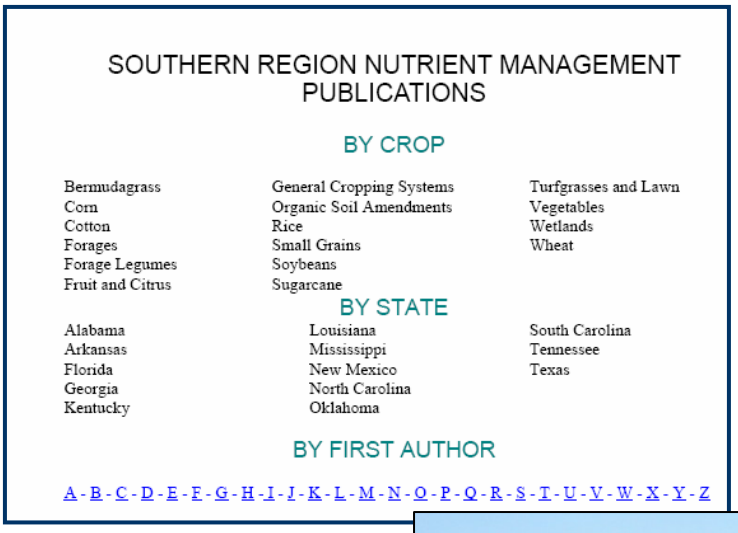
The Nutrient Management Program is one of 12 priority program areas identified by the Southern Region Water Quality Planning Committee. A multi-disciplinary regional workgroup of nutrient management experts is improving nutrient management recommendations to enhance both economic and environmental outcomes in threatened and impaired watersheds. Through strengthened regional and multi-agency collaboration, the workgroup identifies gaps in knowledge and resources, defines significant research needs, and conducts strategic planning to develop appropriate educational and technology transfer tools. This newsletter is an outlet for sharing and showcasing success stories and products from the Nutrient Management Program. It will be posted to http://srwqis.tamu.edu biannually in pdf format. Questions or comments can be directed to the team leaders or the appropriate state contact.

Regional Nutrient Management Publications Database

Mark McFarland, Texas A & M and the Southern Region Nutrient Management Program

The Regional Nutrient Management Program Team has created a publications database featuring all currently available nutrient management publications developed by Extension in the 13-state Southern Region stretching from New Mexico to North Carolina.

http://srwqis.tamu.edu/downloads/pbc.pdf



SOUTHERN REGION NUTRIENT MANAGEMENT PUBLICATIONS

BY CROP

Bermudagrass
Corn
Cotton
Forages
Forage Legumes
Fruit and Citrus
General Cropping Systems
Organic Soil Amendments
Rice
Small Grains
Soybeans
Sugarcane
Turfgrasses and Lawn
Vegetables
Wetlands
Wheat

BY STATE

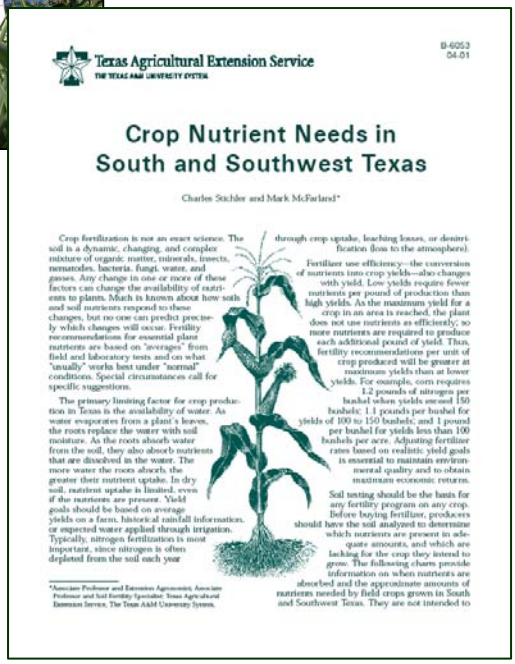
Alabama
Arkansas
Florida
Georgia
Kentucky
Louisiana
Mississippi
New Mexico
North Carolina
Oklahoma
South Carolina
Tennessee
Texas

BY FIRST AUTHOR

A - B - C - D - E - F - G - H - I - J - K - L - M - N - O - P - Q - R - S - T - U - V - W - X - Y - Z

The region's Nutrient Management Team developed the database to enhance access to nutrient management resources at Land Grant institutions in the Southern Region. Currently, 225 publications are available and are grouped by crop, state and primary author.

State water quality coordinators and nutrient management program team members periodically review the database to add new publications and maintain active links.



Texas Agricultural Extension Service
THE TEXAS A&M UNIVERSITY SYSTEM

B-6052
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Crop Nutrient Needs in South and Southwest Texas

Charles Stichler and Mark McFarland*

States use the database in both agricultural and urban watersheds to support outreach programs targeting water resource protection. For example, in the Arroyo-Colorado watershed of Texas where nutrient-related TMDLs are being proposed, nitrogen and phosphorus fertilizer application on agricultural land was reduced by over 4,176,000 pounds through intensive education and training programs, including using soil testing as a Best Management Practice. In addition to reduced potential nutrient loading, the estimated economic impact of the program totaled over $1,002,000 in direct fertilizer cost savings.

Training for Nutrient Management Planners

Deanna L. Osmond and Karl Shaffer, NC State University

For North Carolina (NC) producers of swine, dairy cows, and layers, nutrient management plans have been mandatory since 1997. These plans have been tied to the United States Department of Agriculture (USDA), Natural Resource Conservation (NRCS) Service's 590 standard. North Carolina Cooperative Extension Service provides the training to certify nutrient management planners.

Students in Nutrient Management Training. Photo by DA Crouse, NC State, 2005

For planners to become certified, they must take four courses and pass tests associated with three of these four classes: 1) nutrient management planning, 2) RUSLE, 3) NC Phosphorus Loss Assessment Tool (PLAT), and 4) NC Nutrient Management Planning software. The nutrient management planning course meets for three days. Students are provided with an extensive notebook containing the presentations, background information, relevant tables and websites, and practice problems. During the last day, students working in groups write a nutrient management plan involving animal waste and take their exam. The RUSLE class lasts for one and one-half days. Students have an opportunity to learn soil loss calculations as well as how to make field measurements. The students spend several hours in the field learning to calculate slope, slope length, and other characteristics necessary to calculate RUSLE before taking their test. The NC PLAT training takes 3 hours; students learn the theory of PLAT, but they also learn how to use the software program that calculates the potential P loss from fields. This class also has a test. In the final day-long class, students learn how to use the North Carolina nutrient management software.

After completing all four courses successfully, private-sector planners must petition the NC Soil and Water Commission to become a Certified Technical Specialist (e.g. Certified Nutrient Management Specialist). Public-sector planners must take and pass the relevant courses but do not have to petition the Commission since they work under the auspices of state or federal agencies. Once certified, these Certified Technical Specialists are allowed to write nutrient management plans that meet state of NC and USDA-NRCS nutrient management standards.

"The NC Cooperative Extension Service and the NC Department of Agriculture and Consumer Services provide nutrient management training for several hundred to fifty people per year, depending on the demand. "

The NC Cooperative Extension Service and the NC Department of Agriculture and Consumer Services provide nutrient management training for several hundred to fifty people per year, depending on the demand. Trainees from the private sector come from companies that manage swine and poultry, as well as certified crop advisors, fertilizer dealers, and others working with row crop farmers who use commercial fertilizers. The public sector trainees represent both federal (USDA-NRCS) and state agencies (Soil and Water Districts, state regulatory agencies such as the Division of Solid Waste or Division or Water Quality, and NC Cooperative Extension). The courses are spread throughout the year for added convenience. More information can be obtained from the NC Nutrient Management website at http://www.soil.ncsu.edu/nmp/ncnmwg.

Keep Litter Covered

Charles C. Mitchell and Ted W. Tyson, Auburn University
H. Allen Torbert and Ted S. Kornecki, USDA-ARS Soils Dynamics Laboratory

Current USDA-NRCS guidelines for temporary storage of litter (up to 180 days) provide an environmentally safe method which protects litter quality as a fertilizer. However, some producers complain that maintaining a 6-mil polyethylene cover is difficult. It is difficult to secure. Wind rips it off. Ripped plastic sheeting in fields creates problems with picking and ginning cotton. Intuitively, farmers argue, covered piles do not leach so placing the litter on a concrete or clay pad is unnecessary. Some have observed that properly stacked litter will shed water once a crust is formed so covering may be unnecessary.

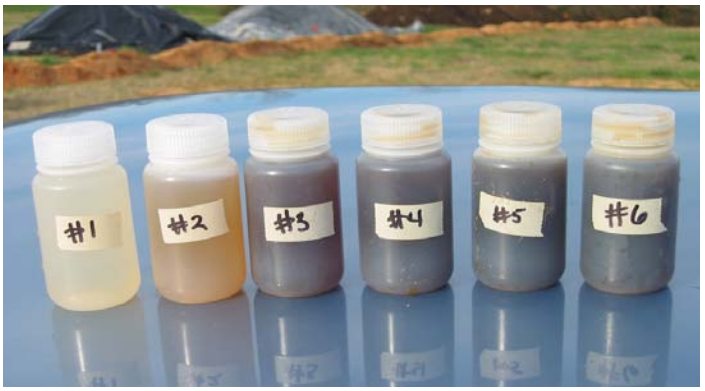


Figure 1. Contaminated runoff was obvious in all the uncovered piles. Runoff from the covered piles also appeared contaminated from litter spilled around the cover but the N and soluble P from the covered piles was much less that that from the uncovered piles. (#1= check plot/no litter; #2= 6-mil poly covered; #3=HayGard® covered; #4= uncovered; #5=cone-shaped pile; #6=polymer-coated pile)

In order to evaluate and demonstrate alternative methods of litter storage, the Alabama Cooperative Extension System worked with the Alabama Mountains, Rivers, and Valleys RC&D Council in North Alabama and the USDA-ARS Soil Dynamic Laboratory at Auburn to conduct a 2-yr test/demonstration comparing methods of storage. In 2005, runoff and leaching from 300-pound mini-piles were compared. Exposed piles quickly became saturated during the wet winter months in Alabama. To make the test more realistic in 2006, 5-ton piles of litter were evaluated using (1) an uncovered pile (the worst case), (2) a cone-shaped, uncovered pile, (3) a cone-shaped pile dusted with a dry polymer to create a water shield when wet, (4) a traditional, polyethylene covered pile, and (5) a pile covered with a commercial Hay-Gard® fabric. The 5-ton piles were put on a grass-covered site and runoff from each pile and an untreated check were monitored from January to June, 2006. Changes in the quality of the litter were also monitored.

Figure 2. View of the piles and the runoff collection system used in 2006.

All of the exposed piles regardless of shape or treatment absorbed water during the first few rainfall events and resulted in significant runoff of ammonium N and soluble P (Fig. 1). Wet litter showed evidence of decomposition during the storage period with an increase in P and ash concentration and a decrease in N and K concentration on a dry matter basis.

> *"As a result of this effort in 2006 and the complementary demonstration in 2005, we can confidently recommend that all temporary litter storage piles should be covered."*

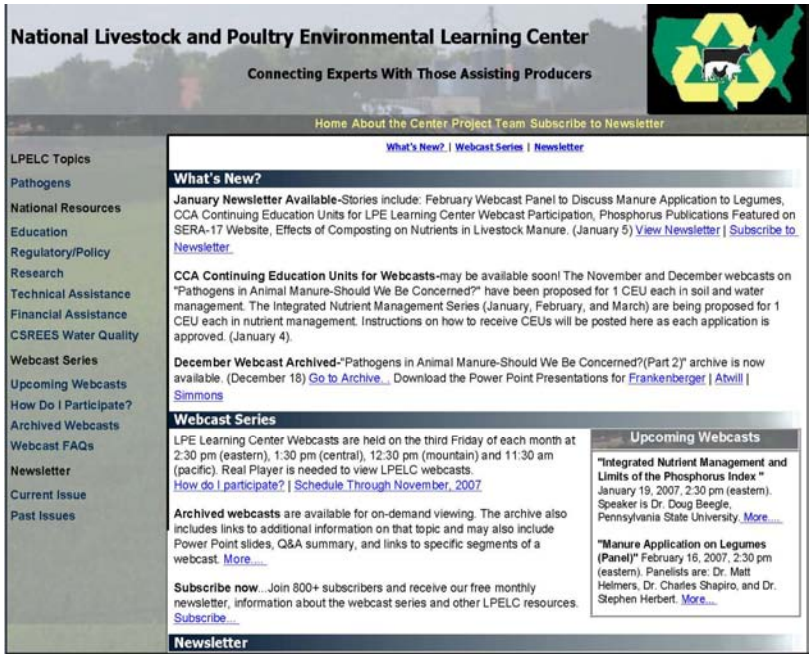
As a result of this effort in 2006 and the complementary demonstration in 2005, we can confidently recommend that all temporary litter storage piles should be covered. The commercial Hay-Gard® product was heavier, provided a more secure cover, and could be used for several years but required a higher initial investment. Producers may not like it, but covering temporary litter piles in the field is the only way to protect the fertilizer value of the litter and prevent nutrient-laden runoff.

Livestock and Poultry Environmental Learning Center

Mark Risse, Rick Koelsch and Joe Harrison, University of Georgia

A national team has established a Livestock and Poultry Environmental Learning Center committed to:

- Implementing a customer driven outreach initiative emphasizing critical and emerging issues.
- Coordinating the assembly of our best science-based information targeting these issues.
- Implementing innovative outreach models for connecting those who create new knowledge with the end users of that knowledge.



On the web at http://lpe.unl.edu/

"Connecting Experts with Those Advising Producers" is the focus of the LPE Learning Center. The Center broadens access to new information supporting sound environmental decision making in animal agriculture by using innovative delivery methods such as its national web cast seminar series. This project is connecting individuals involved in public policy issues, animal production, and delivery of technical services with the nation's best science-based resources responsive to priority environmental issues in animal agriculture. The project connects with more than 800 subscribers on at least a monthly basis through a Learning Center newsletter. Recently completed web cast seminars have summarized proposed changes to federal Confined Animal Feeding Operation regulations, introduced a national curriculum addressing nutrient planning, and summarized the science on pathogens in animal agriculture. Presenters included EPA policy representatives, research scientists from US Geological Survey and USDA ARS, and faculty from Purdue, Iowa State, University of California—Davis, Penn State, and North Carolina. A recent web cast on pathogens reached 240 individuals who advise 30,000 livestock operations annually.

This project has engaged a "Customer Advisory Team" representing stakeholders to help us identify priority and emerging issues, connect potential customers to this project, and evaluate the Center's impact. A national project team leads our outreach activities and builds linkages between organizations that have important research (LGU, ARS, USGS, EPA), educational (Extension, US EPA Ag Center), and planning responsibilities (NRCS). Work groups have formed to address four priority issues: Pathogens and pharmaceuticals in manure; Integrated nutrient management; Value of manure; and Alternative technologies. Each group assembles the "Best of the Best" educational products for web access, three nationally broadcast web cast seminars, and other appropriate resources. Please visit the website at lpe.unl.edu to subscribe to the newsletter and check out the nutrient management resources.

ARS Scientist updates web cast listeners on latest knowledge on pathogens in animal manure.

Improving Nitrogen Use Efficiency with Crop Sensor-Based Technology

Hailin Zhang, Bill Raun, John Solie, and Randy Taylor, Oklahoma State University

Precision agriculture is a new concept awaiting development of science and technology for application to benefit crop production and the environment. Scientists all over the world have been searching for an economical and efficient technique which farmers can use to increase their crop yields and at the same time minimize the impact of fertilization on water and air quality. Several techniques have been developed and tested on large scales. Grid soil sampling-based precision agriculture identifies nutrient deficiencies through extensive soil sampling and analyses. Variable rates of nutrients can be applied according to a nutrient map. However, this approach requires extensive labor and equipment. Both yield monitor-based and apparent electrical conductivity-based approaches require expensive equipment, GPS/GIS hardware and software, and advanced skills of the operator. However, the sensor-based in season nitrogen (N) management technology developed at Oklahoma State University and marketed by NTech, Inc. has proven to be practical and efficient. If used correctly, it can increase nitrogen use efficiency (NUE) by 10-20% and save farmers more than $10/acre in addition to environmental benefits.

Figure 1. Variable Rate (2x2 feet resolution) Green Seeker with multiple sensing units for site specific N application.

The Sensor-based N management uses a "Nitrogen Rich Strip" and a sensor, "GreenSeeker", to predict site-specific yield goal and prescribe the right amount of top dress N. It addresses the point-to-point variability within a field (spatial variability) and year-to-year variability over time (temporal variability) without using costly soil testing and GPS equipment. This commercially available approach has resulted in increased N use efficiency and farmer profit (www.ntechindustries.com and www.nue.okstate.edu).

Long-term research has determined that the amount of N required to achieve maximum yield varies significantly from year to year. Reducing pre-plant N application and applying an N rich strip (applying enough N in a representative area within each field, whereby N will not be limiting) allows for mid-season determination of additional N requirements. If the crop is capable of using additional N, the sensor will determine the magnitude and generate an N recommendation based on the predicted yield.

GreenSeeker is an integrated optical sensing and application system that measures crop status and variably applies the crop's N requirements mid-season. Yield potential for a crop is identified using a vegetative index known as NDVI (normalized difference vegetative index) and an environmental factor. Nitrogen is then recommended based on yield potential and the responsiveness of the crop to additional N. The Variable Rate GreenSeeker System (Fig. 1) applies the right amount of N at the right place and at the right time thereby optimizing yield and N input expense.

Figure 2. A Hand Held GreenSeeker is used to make mid-season N recommendations for winter wheat and several other crops.

Alternatively, the GreenSeeker Hand Held (Fig. 2) utilizes a single optical sensor. The unit's optical sensor captures the light reflectance of plants. The microprocessor circuit board

(Continued on page 8)

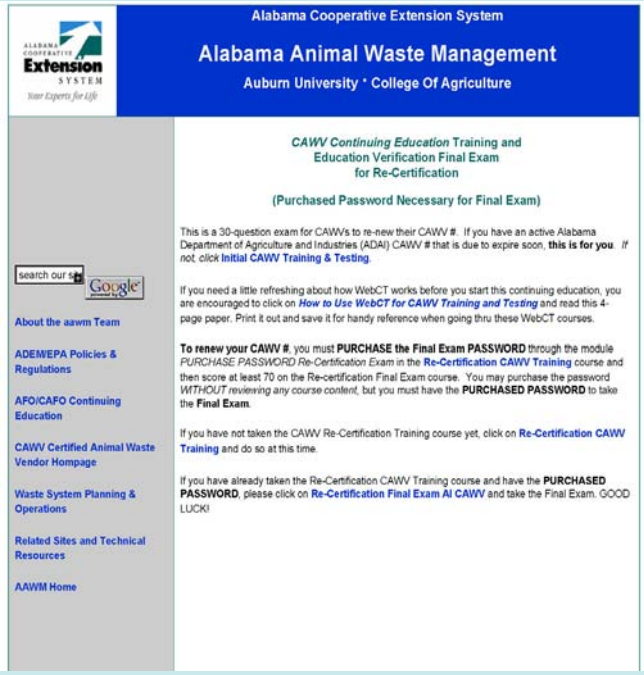
Training for Alabama Certified Animal Waste Vendors

Charles Mitchell and Ted Tyson, Auburn University

When Alabama began its program of Certified Animal Waste Vendors (CAWV) in 1998, the Alabama Cooperative Extension System agreed to provide the training. The Alabama Department of Agriculture and Industries actually certifies the vendors. Over the next 6 years, 4-hour classes were held all over the state evry two years in an attempt to provide those who wished to be certified with the necessary information. Class attendance was mandatory but no exam was given. From 1998 through 2005, over 1000 individuals were trained and 550 were certified and re-certified. This number was far greater than any estimate of the actual number of professional vendors in the State. Many producers and some government agency professionals became certified just because it was so easy to do so. With no specific state-appropriated funds to continue the re-certification every two years, Cooperative Extension specialists and NRCS state office staff could not continue the rigorous travel and time necessary to maintain this program.

The solution came in 2005 just prior to the beginning of a new cycle of CAWV re-certification. Auburn University's open WebCT® program allowed a simple way of creating a web-based training program and registering vendors. There was no direct cost to the student or Extension. Vendors could study the web-based training 24/7 and take an "education verification" exam only when the student felt comfortable with the material. A $35 fee was collected by Cooperative Extension over the web when the exam was taken. Funds were used to cover Extension's costs for developing and maintaining the training program on the web.

Figure 1. The opening page for the CAWV WEBCT training is accessible from the Alabama Extension Animal Waste



There was some pain in adjusting to a computer system by vendors who had never used a computer before. However, county extension personnel walked many of these vendors through the process. In 1998 when the first CAWV classes were held, an informal poll indicated that only around 10% of the vendors in Alabama had ever used or had access to a personal computer. By 2004 when the last classes were held, around 70% were computer users. Today, 100% must be computer users or they cannot become certified. Some who had never touched a computer were proud of their accomplishment in passing the educational verification examination. Becoming a CAWV in Alabama now comes with a sense of pride and accomplishment.

In 2007, web-based offerings have expanded to include different programs for those who are becoming certified for the first time and those who are seeking to become re-certified every two years. The web-based programs are also being used for AFO/CAFO owner/operator continuing education training in Alabama. While it takes some effort and coordination to put these programs together, the professional time involved is much less than face-to-face classes and there is no travel. In 2005 and 2006, 175 vendors were certified on the web. These are truly the professional vendors who haul and spread animal wastes in Alabama. They had to demonstrate their knowledge through the educational verification exam, and Cooperative Extension has some funds to continue and expand this program. To visit the materials offered for CAWV training in Alabama, you can sign up for Auburn's open WebCT by getting your personal login name and password at:
http://www.aces.edu/dept/aawm/Re-Certification%20Training.php

Improving Nitrogen Use Efficiency with Crop Sensor-Based Technology (Cont.)

Hailin Zhang, Bill Raun, John Solie, and Randy Taylor, Oklahoma State University

(Continued from page #)

analyzes the plant's reflected light. The data that is collected with the sensor can be download to a personal computer in a text format that can be accessed by Microsoft Excel and used to calculate N application rates. Rate calculation can also be done using an online program at http://www.soiltesting.okstate.edu/SBNRC/SBNRC.php. This more economical alternative does not address the spatial variability within a field, but it does sense the temporal variability and differences among fields.

The sensor based N management technology has been calibrated for wheat, corn, rice and bermudagrass, and research is underway to extend this technique to other crops. Several states and foreign countries are currently using this new invention for crop production.

More information about this crop sensing based technology to improve N use efficiency can be found at www.nue.okstate.edu.

"Long-term research has determined that the amount of N required to achieve maximum yield varies significantly from year to year. Reducing pre-plant N application and applying an N rich strip (applying enough N in a representative area within each field, whereby N will not be limiting) allows for mid-season determination of additional N requirements. If the crop is capable of using additional N, the sensor will determine the magnitude and generate an N recommendation based on the predicted yield."

CSREES NUTRIENT MANAGEMENT IN THE SOUTHERN REGION NEWSLETTER

This newsletter was created to disseminate information on current projects in the Nutrient Management area.

If you would like to submit an article for inclusion in a future newsletter please contact:

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http://srwqis.tamu.edu/nutrient-pesticide.aspx

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