

2008-2009 Special Projects

McFarland: Enhancing Nutrient Management Education and BMP Adoption

The frequency and degree of nutrient impairment of surface water bodies in the Southern Region is increasing. Both agricultural and urban applications of organic and inorganic products containing fertilizer nutrients are contributing to the problem. Education and voluntary adoption of best management practices such as soil testing, product selection, and application equipment calibration are the least costly and most viable approach to limiting nutrient enrichment of water resources.

Extension personnel across the Southern Region develop and deliver outreach education programs designed to achieve increased levels of adoption of nutrient management practices. Collaboration among these individuals to share the most effective and successful educational tools and resources will enhance overall success of these programs. In addition, comparative assessments of program effectiveness relative to similar efforts in other states will enable participants to better determine and address program needs.

Osmond: Continuation of Southern P Indices Comparison

During the last regional Southern Water Program project (2004-2009), the Nutrient Management working group compared the phosphorus indices (P-Index) from the 12 southern states (AL, AR, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX). This assessment of P-index ratings was based on standard scenarios. There were significant differences in the ratings from state-to-state when the standard conditions were used. This information was used to generate a scientific paper in the *Journal of Soil and Water Conservation* evaluating state-to-state variations and potential implications for agricultural producers. The comparison of southern P-indices was also presented at a conferences sponsored by the CSREES National Water Program, the Southern Plant Nutrient Conference, and the National 2006 Poultry Waste Conference. Due to the significant and real differences in P-indices between states, the work on the P-indices was beginning to be used as the foundation for regional discussions on how to improve consistency in P indices across states. Recently the SERA-17 group used the southern P-index comparison paper to begin a discussion on a national P index tool.

Clearly this work on southern P-indices has had a significant national impact. It is important that the Nutrient Management subgroup of the Southern CSREES Water Program continue to collaborate on P-indices to make them more similar; otherwise a national standard that does not account for local conditions may be developed. Thus, we propose to continue evaluating the differences between the Southern P-indices and try to minimize these differences.

Sharpley: Regionalized Approach for Best Management Practice Development and Monitoring

Several states in the Southern Region have developed, implemented and have been monitoring the impacts of BMPs for successful agricultural production. There is need to establish a framework/protocol for collecting and compiling information on the different BMPs and their specifications, contaminant reduction efficiencies, time after implementation (i.e., age), maintenance required, for example, and to expand the informational database to cover all states in a coordinated manner across the Southern Region. These states are Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, New Mexico, Oklahoma, South Carolina, Tennessee, and Texas. This assessment will also consider which contaminant is of concern and which BMP may be best suited to decreasing the potential for that contaminant to impair surface and ground water quality. Consideration will also be given to state specific conditions and issues, which may influence contaminant or BMP prioritization. Contaminants of concern are increasing, but this project will consider nutrients (nitrogen – N and phosphorus – P) and sediment.

A database showing the details of BMPs adopted, implemented and monitored on watershed scales will provide insight into how the land is being managed as the over-arching goal is still minimizing contaminant impacts on water quality. At this time such a database is not available and can be easily developed through collaboration among member states.

Farahani: Irrigation and Agro-Meteorology Information and Educational Resources to

Improve Irrigation Efficiency and Minimize Environmental Impacts in the Southern Region

There are many challenges facing today's farmers, particularly those with high-input irrigated production systems. In order to efficiently utilize irrigation to remain competitive in increasingly demanding agricultural markets while ensuring environmental sustainability, irrigators need up-to-date information and know-how as well as simple and practical tools and technologies. Networks of agricultural meteorology stations in the U.S. and elsewhere provide a wealth of online data as well as near real-time irrigation information for research and practice. Continuing effort is needed to further encourage the wider use of readily available climate data by consultants and practitioners in addition to installing new stations and networks to fill the many existing and large-area gaps.

In the Southern region, lack of agro-meteorology data coverage or an automated network is obvious in Alabama, Arkansas, South Carolina, and Tennessee, as well as parts of Texas and the Florida Panhandle. In South Carolina for example, there is no network of reference ET data for ET-based irrigation scheduling or an irrigator-friendly website with up-to-date irrigation information. Statewide agro-meteorology networks as well as collaborative and innovative education and training in the principles and practices of irrigation water and system management is a critical need in many Southern states. It is thus incumbent upon scientists and educators to enjoin the skills, knowledge and commitment to effectively address shortcomings in agricultural irrigation water management and efficiency.

Ferrier & Silitonga: Regional Collaboration to Protect Drinking Water Resources

To avoid negative impacts on water quality, it is critical to provide information to the public about both on-site consequences and off-site impacts, particularly at the rural/urban interface. To address this issue, we propose to build a regional network of educated volunteers who are motivated to share their knowledge with others based on Pennsylvania's highly successful "Master Well Owner Network" and Master Gardener Programs.

A regional education curriculum and network will reach land owners and rural residents in the topic areas listed below. Hence, any Southern Region State will have the option to use the entire curriculum or a portion that fit their needs. Some States already have curriculum and publications on these topics. These resources will be accumulated and incorporated into the manual and shared with the community of practice through eXtension.

Adams & Borisova: Determining Water Conservation Policy Tools Appropriate for Local Conditions in Southern States

This project supports the development of water conservation programs in several Southern states. We address the following specifically-identified needs and goals outlined in the Southern Regional Water Resources Program (SRWRP) work plan approved by USDA-CSREES:

- We focus directly on providing baseline information on alternative water conservation policy tools that can be used to address water supply shortages. Included in the analysis is an evaluation of behavioral changes (water use) in relation to alternative policy tools.
- We expect the project to improve the understanding of the use of alternative water policy tools and their relative effectiveness (e.g., cost, adoption rates, water savings) by professionals in the land grant system, policymakers, and other stakeholders.
- The PIs and collaborators have expertise in economics, policy analysis, law and other fields represented within the land grant system. We draw from this expertise to create deliverables that should improve the recognition of this expertise by stakeholders, particularly relating to water policy decision-making and drought management. Results of the project are also relevant to water rights, which can constrain available water policy tools.

Smolen: Water Law and Water Rights Primer for the Southeast States

Current work by the PIs and collaborators summarizes and compares water law and water rights in four states with Western (prior appropriation) or hybridized (riparian & prior appropriation) water law systems. These include New Mexico, Oklahoma, Texas and Arkansas. This proposal will expand the study to include three or four Eastern states with riparian or hybridized water law systems. Project outputs will include a Primer on Water Law and Water Rights for use by Extension Educators, Policymakers, and the general public. The project will culminate in a series of water rights/water law seminars in two or three locations.

Saraswat & Tsegaye: Watershed Assessment Tools for Extension and Research (WATER) Training Project

The Regional Watershed Assessment and Modeling (WAM) Team decided to focus on the expansion of the use of technology-mediated watershed assessment tools among various target audiences (cooperative extension personnel and other watershed assessment groups) through the development of a watershed assessment training initiative referred to as **W**atershed **A**ssessment **T**ools for **E**xtension and **R**esearch (WATER). The general consensus of the regional WAM focus team was that by providing this type of training for county extension agents, municipal water managers, water quality volunteers, and other relevant stakeholders, more professionals will gain a better understanding of regional watershed issues and more effective local watershed protection and restoration efforts can be implemented. The team also felt that by designing specific training programs for rural youths and community leaders, they can also be integrated within the focus of the team objectives. The WAM team decided to use web technology for data dissemination to the full range of clientele, from extension agents, watershed researchers, and watershed managers to watershed stakeholders. The goal is to enhance the Southern Regional Water Program (SRWP) website (<http://srwqis.tamu.edu>) by adding information related to water quality and quantity for individual watersheds and provide more detail on impairments. These enhancements will be offered using point-and-click mechanisms, keeping user friendliness in mind. The team regards regular maintenance of the existing website to reflect current content as an item of critical importance for the success of the WATER objectives. These measures will help educate watershed stakeholders and other water resource professionals and volunteers in using watershed assessment tools. This will lead to a true understanding of the dynamics of watersheds, better conservation and land use decisions, and ultimately allow them to extend the knowledge to their constituents and communities.

Osborne: 4-H₂O Ambassador Program

The 4-H₂O Ambassador Program will address key concepts related to watershed education. This

program is part of an ongoing effort in Kentucky and Tennessee to educate and empower youth to conserve and protect our water resources, and will be in collaboration with two additional ambassador programs currently taking place in central and western Kentucky. At the end of the four year program, results will be shared at local events, and regional and national conferences. Other states within the Southern Region will be encouraged to promote the 4-H2O Ambassador Program within their states, and will have access to program materials (i.e., units, agendas, and promotional materials). The program will include five units, each of which will focus on a specific question related to water quality and watersheds. Each unit will include hands-on, investigative activities (e.g., chemical, biological, and physical analysis of local water bodies, watershed mapping using GPS/GIS technologies, community-based research). Volunteers trained on unit curriculum will assist youth in these activities. After completing all units, youth will become 4-H2O Ambassadors. As ambassadors, youth will be required to develop and implement a community-based service project.

Brantley: Watershed Academy – Principles of Water Monitoring, Planning, and Restoration

Watershed Academy trainings are designed to introduce diverse watershed topics including hydrology, natural resource based planning, stormwater management, erosion and sediment control, ecosystem restoration, stakeholder involvement, and project funding. Regional expertise of Extension water professionals is used to deliver effective and engaging presentations to agents, watershed nonprofit representatives, local, state, and federal agency contacts, and natural resource professionals. Multi-state partnerships in planning and conducting Watershed Academies tailor trainings to be uniquely relevant for each location.

To date, over 200 natural resource professionals have been trained in Watershed Academies that have been held in the southern region. Eight unique Watershed Academies have been held since 2004: Fairhope, AL; Asheville, NC; Clemson, SC (2); Athens, GA; Duck, NC; Nashville, TN; Georgetown, SC.

Hartup: Southern Regional Water Program: Supplement for Residential Water Harvesting

This program proposes to increase knowledge and accelerate the adoption of simple, on-the-ground practices that may be implemented in urban and suburban landscapes that improve the quality of stormwater runoff and promote water conservation. Program development of residential stormwater harvesting, especially rain barrels and cisterns, and backyard rain gardens will be shared through a 'train-the-trainer' program led by NC Cooperative Extension.

Hawkins: Alternative Uses for Animal Manure

Communication among the Region 4 and 6 animal waste management specialists confirms a recent spike in producer interest recovering energy from manure. Recurring inquires concern generating biogas from broiler or dairy wastes for heat energy recovery or electricity generation. Currently, the southern region lags well behind the nation as a whole with only eight operating manure digesters (7% of the national total); the vast majority of states (9/13) contain no manure digesters. In addition, producers are increasingly expressing interest in direct combustion of animal manure, particularly to offset costs for propane and natural gas used to heat broiler houses.

The increasing interest of producers in alternative manure management technologies is coincidental with other segments of the US economy seeking creative ways to manage high strength organic waste byproducts (e.g. food processing wastes and municipal yard and wood wastes). Mixing these waste streams with manure could enhance their conversion to energy and more stable organic matter that can be land applied without degrading water quality. For liquid waste streams, this could involve co-digestion to produce biogas that is converted to heat or electrical energy. For solid waste streams, this could involve

co-composting animal manure with high carbon municipal waste and/or food processing byproducts. In either case, farmer cooperative or community organic waste management systems could prove to be a better management solution in areas with dense animal numbers or communities with the right mix of animal agriculture and non-farm organic wastes. However, a potential hindrance to implementing these alternative manure management schemes is confusion in the regulatory community about how to regulate cooperatives and combined waste streams.