

“USDA NRCS Technology News” ~ November 2001

United States Department of Agriculture
Natural Resources Conservation Service
Science and Technology

“USDA NRCS *Technology News*” is a monthly electronic information piece provided by Science and Technology. It is designed to deliver pertinent information to our customers about new technology, products, and services available from the Soil Survey and Resource Assessment and the Science and Technology deputy areas. “USDA NRCS *Technology News*” is in a format that is available to all NRCS field staff.

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MESSAGE FROM THE DEPUTY CHIEFS

Lawrence E. Clark and Maurice J. Mausbach

Twenty years ago, it would have been hard to find a Natural Resources Conservation Service (NRCS) employee who had not grown up on a farm or ranch. Today, it is much more difficult to find employees who can trace their roots to that same starting place. This change is also true for many rural communities. Once, these communities were the

focal point for farmers, ranchers, and those who were closely associated with the world of agriculture through business, social, and other networks. Everyone in the community understood the process of producing food and fiber, and lived comfortably with the inconveniences as well as the benefits.

Now many rural communities, especially those in the urban and suburban fringe, are populated with people who are generations removed from agriculture. In the words of one journalist, they “think milk comes from a big metal tanker truck.” While most new rural residents are probably not quite that naive, they do lack an appreciation and understanding of the processes in agriculture that result in the food they eat. They move to the “country” seeking the picturesque red barns of their children’s books, only to find a far different environment. They complain about slow farm equipment on their narrow country roads, about pesticide drift from crop spraying, and about odor from dairies and hog farms.

“A Sip of Wine, a Rustic View, and Hog Waste” (1) is a recent New York Times article in which the author, David Chen, describes a classic farm/suburban conflict over the odor from hog farms in New York’s Finger Lakes Region. The discord is complicated even further by the presence of a successful wine industry that attracts numerous tourists to the region. In Mr. Chen’s words, “Wine and swine don’t mix.” Local residents, accustomed to their bucolic existence amid the vineyards and glacial lakes of central New York, have been particularly disturbed by the odor from swine waste. As Thomas Bjorkman, a horticulture professor at Cornell University comments, “It becomes a rather significant psychological stress to have this with regularity. It’s like being inside an outhouse.” (2) New York State, like many states in the nation, has a “right to farm” law that protects farmers against litigation and preserves their right to continue farming. At the same time, farmers are also learning better strategies for getting along with their non-agricultural neighbors. Many notify their neighbors before land application of stored livestock waste or pesticide/herbicide applications. Others even have tours and barbecues on their farms to educate their non-farming neighbors or make periodic mass mailings to get feedback on their farming practices.(3)

According to the American Farmland Trust (AFT), right-to-farm laws are intended to discourage neighbors from suing farmers. They provide farm families with a psychological sense of security that farming is a valued and accepted activity in their communities. Most important, according to AFT, is that right-to-farm laws help established farmers who use good management practices to prevail in private nuisance lawsuits.(4)

In all of the government policy and program development aspects of nutrient management planning and waste management, it is easy to lose sight of this very simple fact: farmers and ranchers want and need to be good neighbors—particularly in areas where they live side-by-side with non-farmers with little or no understanding of the business of agriculture. Comprehensive Nutrient Management Plans and water quality are of utmost importance. However, we should not lose sight of the fact that one of our ultimate goals is not just control of animal waste, but the acceptance of practices

associated with farming and ranching in communities where agriculture has become an anomaly to much of the population. The need for this acceptance will become even more important as the interface between rural communities and urban/suburban sprawl continues to expand.

Science and technology have an important role to play in identifying practices and technologies, such as odor and run-off control, that will enable farmers and ranchers to reduce the undesirable impacts of agricultural activities on their neighbors. Through science and technology we can have a significant impact on the protection of natural resources—soil, water, air, and plants—but we can also have a significant impact on community relationships between those who make their living in agriculture and those who try to live in harmony with it.

1. Chen, David, “A Sip of Wine, a Rustic View, and Hog Waste,” New York Times, August 12, 2001
2. Ibid.
3. Bills, Nelson, “Agricultural Districts, Right-to-Farm Laws and Related Legislation,” paper presented at the AAAS Meeting, Baltimore, MD February 11, 2001
4. American Farmland Trust, Farmland Information Center, *Fact Sheet on Right-to-Farm Laws*, September 1998

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CONSERVATIONIST’S CORNER

Robert N. Jones, State Conservationist, Alabama

The Science and Technology Consortium has proved to be a valuable resource for NRCS in Alabama. We rely not only upon technical expertise of consortium scientists, but also on the products and services that the Institutes and Centers provide.

If you were to drive throughout Alabama, one thing would be very apparent—trees. Forestry accounts for a large portion of the agricultural income in Alabama. There are many years, however, between planting the seedling and harvesting the tree. Is it possible to combine another agricultural practice with timber production, while simultaneously enhancing environmental conditions and improving the enterprise cash flow? Silvopasture is an option that could perhaps meet this goal. Silvopasture is an agroforestry system that integrates intensively managed forage systems with the growing of trees for timber products. Silvopasture demonstrations have been established at the Auburn University Solon Dixon Forestry Center in Andalusia, Alabama, and at the NRCS Plant Materials Center in Americus, Georgia. These demonstrations were made possible by financial support from the National Agroforestry Center and the Conservation of Private Grazing Land Initiative. To learn more about silvopasture and the potential for our customers, a multi-agency training session for NRCS and Cooperative Extension was held.

The Soil Quality Institute (SQI) has provided tools to help NRCS Alabama improve in the area of conservation planning and application. Products, such as the Biology Primer, Soil Quality Health Kit, Soil Quality Health Card Design Guide, Phosphorus in Agriculture pamphlet, Agronomy Technical Notes, and Urban Technical Notes, are a few of the Institute's products we use. The SQI also provided Soil Quality Kit and Card training to our employees and worked with the Monsanto Center of Excellence to assist with field day demonstrations. A paper company called upon the expertise of the SQI to help with an alternative plan for site preparation to alleviate some of the compaction problems. We have relied upon the proficiency of the SQI to give technical presentations to the Alabama Association of Conservation Districts and at the annual meeting of the Alabama Chapter of the Soil and Water Conservation Society.

To address waste management issues in Alabama, we established an interagency waste management team in 1995, with four people representing NRCS and the Alabama Cooperative Extension System (ACES). Since that time, the team has developed into a true multi-discipline partnership that includes representatives from the NRCS Conservation Engineering Division, the Soil Survey Division, and the Ecological Sciences Division, as well as representatives from other Federal and State agencies and private industry. The mission of the team is two-fold: (1) to help those in the state dealing with animal agriculture to be true stewards of the land and (2) to ensure that animal agriculture continues to play a vital role in Alabama's economy. The approach of the team is to use an existing multidisciplinary/interagency team with expertise in soils, poultry science, agronomy, economics, production, and regulation to help address any animal waste issues in the state. The team recently won the Region IV Environmental Protection Agency Environmental Stewardship Award.

As a result of these cooperative efforts with Centers, Institutes, and Divisions, NRCS Alabama conservationists and partners have a better understanding of the new technologies that are available to our customers to assist them in making better management decisions.

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NEW PRODUCTS AND SERVICES

#1 Algorithms Assist Data Population in NASIS

Scientists at the National Soil Survey Center are working closely with University partners and Agricultural Research Service scientists to create algorithms in the National Soil Information System (NASIS). Algorithms, also known as pedotransfer functions, are mathematical equations that can describe the relationship between soil properties. Algorithms are used in NASIS in two ways: (1) to identify improbable relationships between soil properties, and (2) for some properties, to populate the database with initial values based on other characteristics in the soil.

Data population is important to field scientists because many national agricultural programs depend on environmental models, such as RUSLE2 and the Wind Erosion Prediction System (WEPS). These models, in turn, depend on soil survey data in NASIS that are accurately and completely populated. WEPS, for example, requires particle size distribution, water retention, saturated hydraulic conductivity, organic matter, pH, cation exchange capacity, and calcium carbonate data from NASIS. When the database is not fully populated and there are no reliable laboratory data or other sources of information with which to populate it, algorithms can provide reasonable initial values in many cases. Water content algorithms are already implemented in NASIS.

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#2 Additional Soil Survey Climate Analyses Under Development

Soil survey climate analyses are under development by the Water and Climate Services team at the National Water and Climate Center. These analyses are integrated into new soil survey manuscripts and provide useful climatic guidance information about the soil survey area. Between 50 and 100 climate analyses, in the form of narrative text and accompanying tables, are prepared each year. The tables contain information from one or more climate stations' monthly and annual precipitation and temperature statistics, as well as information about heat units (growing degree days) and frost dates. The narrative information is based on these tables and on new climate maps of precipitation and temperature developed through the NRCS Climate Mapping Project. Each narrative describes a soil survey area's climate, including averages and measures of variability. It also provides an overview of past extreme weather, snowfall and snow depth, humidity, sunshine, and wind.

More than 230 analyses can now be viewed and downloaded in digital form from:
<http://www.wcc.nrcs.usda.gov/water/climate/soil-nar/soil-nar.pl>

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#3 AWM-Related Install Program Now Certified

Animal Waste Management software (AWM) was released earlier this year. AWM estimates the production of waste materials within an animal feeding operation and determines the size of storage/treatment facilities. Most states have implemented the program. However, some states have been waiting for a Common Computing Environment (CCE)-certified installation program for a necessary Windows™ component called MDAC. The MDAC install program, CCE 4 Upgrade, is now CCE-certified.

The CCE 4 Upgrade will install three shared components – the Windows™ Installer Engine, a shared .doa file, and MDAC 2.6. It can be acquired in two ways. It is being distributed with the new version of Customer Service Toolkit (CST). The CST download file unzips to provide two files—CCE 4 Upgrade and CST Toolkit Install. The CST download file is 41.3 MB and requires a significant amount of time to download. It is available at <http://www.its.nrcs.usda.gov/toolkit>. For users interested only in installing MDAC, the CCE 4 Upgrade program can be downloaded from the National Water and Climate (NWCC) web site at <http://www.wcc.nrcs.usda.gov/water/quality/common/wastemgmt/awm.html>.

The CCE 4 Upgrade program should be run before the AWM install program. The AWM program, awm106_inst.exe, is available from the CCE web site at <http://www.servicecenter.usda.gov/release/> and the NWCC web site listed above.

Programming is underway for the next version of AWM. The AWM design team met in August to rank potential enhancements and discuss coordinating AWM with the Purdue Manure Management Program.

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#4 Climate Reports Updated With New Normals

The long-term climate “normals”, used in a variety of conservation practices, are being updated by the National Water and Climate Center to reflect the new “normal period” of 1971-2000. The normals and derived probabilities for precipitation, temperature, and other climate parameters are being incorporated into web-based reports for general use in conservation and resource management.

The following reports are being updated: The Temperature and Precipitation Summary (TAPS), Last and First Frost Dates (FROST), Growing Season Length (GROWTH), and Wetlands Normal Ranges for Monthly Precipitation and Growing Season Length (WETS).

Updated NRCS climate reports will be available January 1, 2002, when all climate agencies switch to the new normal period. The information will be posted to the National Water and Climate Center homepage at http://www.wcc.nrcs.usda.gov/water/w_clim.html

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#5 Computer Security Pilot Project Initiated

The National Water and Climate Center (NWCC) is a Data Center within the USDA Information Infrastructure. The NWCC processes approximately 800,000 observations per week from snow and climate monitoring. It provides data and reports to users at the rate of 24,000 file downloads per week. Some of the users currently have access to NWCC computers to enter and edit data and conduct analyses.

A pilot project to use Public Key Infrastructure (PKI) has been installed at the NWCC to address information security. For non-public NWCC servers, “certificates of authority” will be required for access. This pilot, if successful, may lead to the use of PKI for all USDA data centers.

Web traffic continues to increase for the NWCC web site <http://www.wcc.nrcs.usda.gov>. Statistics as of September 17, 2001, show 3,795,338 hits. Visits per month average 26,464, with a daily average of 872 visits and 3,847 pages viewed.

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#6 New Water Management Tools Under Development

The National Water and Climate Center has introduced new tools for water management—AgPipe, FIRI, and Phaucet. These tools are designed for field office staff. AgPipe is the second generation of an earlier Alpha version, FIRI is a windows wrapping of the DOS program FIRS, and Phaucet is a new program. These programs are Common Computing Environment (CCE) certified to allow for select field testing and evaluation. Both FIRI and AgPipe are Alpha versions, and volunteers are sought to provide testing so that they can be advanced to Beta versions.

The AgPipe program has been repackaged for better usability based on comments from the field. It is a Windows program for designing irrigation and livestock pipe systems. The hydraulic pipeline program designs tanks, evaluates surge/water hammer and pipe deflection, and provides pipeline valve air vent suggestions. CCE Version: ftp://ftp.wcc.nrcs.usda.gov/water_mgt/CCE_Models/agpipe_inst.exe (9.9MB) Non CCE Version: ftp://ftp.wcc.nrcs.usda.gov/water_mgt/CCE-non_Models/AgpipeAlph201.exe (9.9 MB)

FIRI is a procedure developed to evaluate water conservation resulting from different irrigation systems or management alternatives. The program provides a standardized means of documenting water conservation for various cost-share programs and conservation planning. The model can be used for both field- and watershed-scale evaluation of irrigation changes and the impact to water quality. CCE Version: ftp://ftp.wcc.nrcs.usda.gov/water_mgt/CCE_Models/firi_inst_a1.exe (8.8 MB) Non CCE Version: ftp://ftp.wcc.nrcs.usda.gov/water_mgt/CCE-non_Models/Firi.exe (9.2 MB)

Phaucet is a Windows design and evaluation tool for furrow irrigation systems using lay-flat or rigid tubing. The program calculates existing system performance and evaluates alternatives for improving irrigation efficiency. The variables that are evaluated include pipe diameter, pressure, gate openings or hole sizes, watered furrow spacing, pipe crown elevations, row lengths, and system flow rate. Output includes pipeline pressures, furrow flow rates, and pipeline low quarter distribution uniformity. CCE download: ftp://ftp.nrcs.usda.gov/usda/fac/cce/applications/Phaucet/PHAUCET_INST.exe (7.3 MB)

If interested in testing or for more information, contact:

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#7 New Locally Led Conservation Tools Available

A 20-minute program overview video and a self-scoring evaluation procedure enhance the usability of the Social Sciences Institute's (SSI) nine-module training program for locally led conservation training. "Developing Your Skills to INVOLVE COMMUNITIES in Implementing Locally Led Conservation" teaches through lecture, activities, and exercises how to: profile communities, identify and prioritize issues, share community power, develop networks, work in multicultural environments, facilitate groups, and manage conflict.

The video provides an overview of the locally led planning process, displays district training of state, district, and NRCS employees, and highlights how the district and this current training program can fit together to train employees in locally led conservation planning in urban and rural settings.

The self-scoring evaluation procedure is available on CD and under the link called "Evaluating Your Locally Led Project" on the SSI web site <http://www.ssi.nrcs.usda.gov/>. The respondent's skills are measured relative to those needed to implement successful locally led plans by questions exploring the areas of community attributes, stakeholders, community issues, community profiles, consensus building, conflict, and diversity. An overall score is provided along with scores for each of the 9 training areas (modules). A weak score in a module identifies an area for further training. Future training can then be customized for one or more modules to meet the respondent's needs or the combined needs of the planning group. The instrument on the web site suggests requesting training through your state's social sciences coordinator.

A more detailed introduction to the locally led conservation training program is available from SSI as a pamphlet or under "Training" at <http://www.ssi.nrcs.usda.gov/>.

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TECHNOLOGY TRANSFER

#8 Plant Materials Centers Address Wildfire Recovery

The current issue of “Plants: A Growing Alternative” focuses on post-wildfire revegetation, one of many wildfire-related activities undertaken by Plant Materials Centers (PMC). Projects range from developing plants and techniques for rehabilitation of burned lands to researching which plants and landscaping methods may help to lessen fire damage and protect lives in populated areas.

To view the current issue of Plants as well as other PMC wildfire publications, visit <http://plant-materials.nrcs.usda.gov/> and click on Current Feature.

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TRAINING

#9 New Curriculum for the Soil Science Institute

The Soil Science Institute, hosted by various land grant universities in cooperation with the Soil Survey Division, is including a new curriculum that will place emphasis on soil geomorphology and its application to understanding the relationship between soils and the landscapes on which they occur. It is an intensive academic refresher for early- to mid-career soil scientists.

In past years the Institute has focused on core academic subjects, such as soil chemistry, soil physics, and statistics. Recently, however, the Division has seen a need for increased training in soil/landscape relationships and landscape analysis. As a result, the Division is now sponsoring two curricula for the Soil Science Institute. The original curriculum, Soil Science Institute I – Fundamentals and Applications, will be offered in odd numbered years. The new curriculum, Soil Science Institute II – Soil Geomorphology, will be offered in even numbered years.

The first session with the new curriculum will be held at New Mexico State University, Las Cruces, September 4-26, 2002. The session is open to any soil scientist with three or more years of experience in grade levels GS-9 through GS-14.

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#10 Prescribed Burning Courses Address Fire Ecology and Resource Effects

In 2000, there were more than 79,600 fires in the United States and over 6,862,600 acres were burned. It was one of the highest years on record. The wild fires last year caused much concern over the role of fire in North America from the perspective of air quality in addition to resource damage and property loss.

The fire return interval varies significantly across the United States, from every year or two to intervals of up to 100 years. The occurrence of fire in the urban/wildlife interface is becoming more common. NRCS employees need to understand the role of fire in their areas and help cooperators and other clients understand it as well. Fire can bring beneficial or disastrous effects on life and property. We need to work with clients not only from the resource and property protection standpoint, but also regarding the use of fire for resource maintenance, improvement, and restoration.

The Grazing Lands Technology Institute (GLTI) is working with the National Employee Development Center and several universities around the country to develop and refine the Prescribed Burning courses to cover more fire ecology and fire effects on resources. The GLTI has also developed an Introduction to Prescribed Burning course and has plans to develop this as a web course available to all NRCS employees.

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USDA NRCS TECHNOLOGY NEWS

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