



NRCS



# **Technology News**

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**September 2003**

“NRCS *Technology News*,” provided by Science and Technology, delivers 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.

“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**

Agroforestry challenges natural resource professionals and landowners to think “outside the box” when considering management options for their croplands, pasturelands, and forest lands. How can that traditional windbreak design be modified to help mitigate livestock odor, pesticide drift, or traffic hazards from blowing snow? How can that riparian buffer protect natural resources, but also provide added income? When you think “Productive Conservation,” think Agroforestry.

“Conservation Pays!” Some practices like conservation tillage reduce operating costs while protecting natural resources for improved long-term productivity. But how many conservation practices can improve the environment and provide additional income for the producer? Agroforestry practices offer an opportunity for ‘Productive Conservation.’

The term agroforestry may be relatively new to NRCS, but the application of agroforestry in the United States pre-dates the beginning of the Soil Conservation Service in 1935. The Dust Bowl era of the 1930s focused attention on the need for windbreaks for soil protection. However, since that time, the NRCS has recognized five agroforestry practices: windbreaks, riparian forest buffers, silvopasture, alley cropping, and forest farming (see [www.unl.edu/nac](http://www.unl.edu/nac) for more information).

Agroforestry is productive conservation because it is more than just a suite of conservation practices. Agroforestry practices are land management systems consisting of permanent vegetation, trees, and shrubs that create stability on the landscape and produce on-farm income.



Field windbreaks in North Dakota protect soil against erosion.

Taking advantage of the conservation aspects of agroforestry practices is straightforward. The tree and shrub components of windbreaks, riparian forest buffers, and alley cropping slow the movement of wind and water across the land, which helps to keep sediment and pesticides in the field and out of lakes and streams. NRCS has successfully applied riparian forest buffers (200,000 acres/year) and windbreaks (4,000 miles/year) for these purposes. However, with some creative design these same practices can also provide income diversification by growing specialty products, such as nuts, fruits, decorative florals, herbs, and wood products. Woody decorative florals alone are a multimillion dollar industry in the United States. Research in Nebraska has shown that in just 1,000 feet of a windbreak or riparian buffer, thousands of marketable stems can be produced without reducing the ecological function of the practice. But taking economic advantage of agroforestry requires an understanding of the tree and crop interactions so that the trees and shrubs can be intentionally integrated into the crop or forage production system. Many of these ideas have been discussed in the nine conservation buffer training courses held over the past year and a half. The challenge now is to incorporate these multipurpose designs into our conservation planning.

Silvopasture also offers economic diversification to many farmers and ranchers in the Southeast and Northwest. These intensive grazing systems combine short-term livestock products with long-term wood products resulting in a greater overall financial return per acre than pasture or forest alone. Silvopasture can also provide a fuel load reduction opportunity when sound forestry and grazing principles are applied, thus reducing the wildfire threat and improving forest health. Recent intensive silvopasture training in the Southeast is beginning to reap results, and a new national silvopasture practice standard is out for review.

Forest health can also be improved with the fifth agroforestry practice, forest farming. As our private forest land becomes increasingly fragmented, forest farming can offer an economic return to these small forest tracts while also encouraging sound forest management. Needed forest stand improvement can be increased through the intentional cultivation of specialty products in the understory of the forest. The needed forest management is done while providing short-term income from herb, fruit, decorative, or handicraft products. For example, high quality ginseng can return thousands of dollars from less than an acre of land. In New England, through a joint partnership between NRCS, RC&Ds, Extension, and others, an effective outreach effort is in progress to train natural resource professionals and landowners about forest farming opportunities. Also, work is underway to bring forest farming into the field office technical guide, which will address the agroforestry needs of the tropical regions.

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## **CONSERVATIONIST'S CORNER**

**Joan Perry**  
**Director, Pacific Basin Area**

The Pacific Basin Area (PBA) is unique within our Agency. NRCS employees are located in the Director's office (equivalent to a state office) in Guam and at the five PBA Field Offices (Guam, Saipan, American Samoa, Palau, and Pohnpei). They provide valuable technical assistance to and interact with Pacific island growers from over 15 distinct cultures and 30 languages. The PBA staff works with partners from many local governments within the two U.S. territories, one U.S. Commonwealth, and the three independent nations to conserve and protect the islands' natural resources. These islands,



Micronesia  
Courtesy of the Pacific Basin Area.

numbering in the hundreds, are scattered across an area larger than the continental United States. A myriad of subtle and island-specific cultural traditions governs the management of the islands' resources.

The high rainfall and economic limitations of many island farmers are two of the special challenges we face in the Pacific Basin. Recent visits to the Pacific Basin by Lawrence Clark, Deputy Chief of Science and Technology, and Diane Gelburd, Director of Ecological Sciences Division, assisted us as we address some of these special challenges, such as the soil loss quality criteria. With RUSLE (Revised Universal Soil Loss Equation) rainfall factors in PBA as high as 2,400 and soil loss tolerance levels at 1 for many soils, many of our growers cannot meet temperate-climate quality criteria levels regardless of the conservation practices applied. The Ecological Sciences Division is working with us to establish quality criteria appropriate to the tropics, but that still protect the soil and water resources. A science review to evaluate the appropriateness of RUSLE under tropical situations is another benefit of their visit. The PBA staff is working closely with cooperating scientists to plan this review.

Delegates from the Grazing Lands Technology Institute recently traveled to the Pacific Basin to help us implement our ecological site descriptions. This work caps that done previously by the Institute that resulted in the publication "Forage Grasses and Legumes of the Pacific Basin."

Perhaps the most exciting new technology to be implemented is "no-till." For farmer Ernie Wusstig on Guam, converting his 20-acre, conventionally tilled farm to no-till was a significant step in adoption of no-till in our area. Mr. Wusstig, chairman of the Northern Guam Soil and Water Conservation District, was using a conventional-till, continuous corn rotation during which he disked multiple times prior to using his conventional two-row corn planter. He was getting three harvests per year, but paying the price in soil loss. Mr. Wusstig, recognizing the need to make major changes to protect his soil resource, is the first to utilize a no-till planter in the Pacific Basin.

No-till equipment is not available on-island, and shipping equipment from mainland United States is costly. Mr. Wusstig and his son, therefore, fabricated their own no-till planter from two coulters purchased off-island. The coulters are aligned with their old John Deere two-row corn planter, and this set-up allows them to seed into the heavy

residue from the previous crop. Mr. Wusstig also added the green manure crop, *sunhemp*, into his rotation with the sweet corn to add nitrogen and organic matter to the soil, improve pH, increase water-holding capacity, and to control nematode populations. Soil erosion on his 10 percent slopes was reduced from 30 tons per acre per year to 1 ton per acre per year. Mr. Wusstig is now building soil.

The recent formation of the Tropical Natural Resources Technology Consortium ([www.ttc.nrcs.usda.gov](http://www.ttc.nrcs.usda.gov)) provides an excellent opportunity to share and receive technology relevant to our unique tropical situation in the Pacific Basin Area.

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## **NEW PRODUCTS AND SERVICES**

### **#1 Midwest Native American Survey Study Released**

*“Evaluating Resource Needs of Native American Tribal Governments in the Midwest Region,”* a technical report recently released by the Social Sciences Institute, presents the results of a survey of 35 Federally recognized tribes in the Midwest Region. Michigan State University designed and approved the survey that assessed Native American knowledge of, participation in, and satisfaction with USDA and NRCS programs and services. The study also identified current and future natural resource concerns, band-sponsored educational opportunities/programs, and perception of the cultural sensitivity of the USDA.

The report, which includes graphs and tables of the survey results, is available on the Institute’s Web site at [www.ssi.nrcs.usda.gov](http://www.ssi.nrcs.usda.gov).

For more information, contact:

Barbara Wallace  
Social Sciences Institute  
616-942-1503  
[barbara.wallace@usda.gov](mailto:barbara.wallace@usda.gov)

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### **#2 “Evolution of Conservation Payments to Farmers” Released**

NRCS is implementing a range of financial assistance programs amended by Title II of the Farm Security and Rural Investment Act of 2002. “Evolution of Conservation Payments to Farmers,” a paper that gives some helpful perspective on past programs of financial assistance for conservation, was distributed in pdf (Adobe) format by Douglas

Helms, senior historian at NRCS. It reviewed elements of the Agricultural Conservation Program, Soil Bank, and other earlier financial assistance programs.

This paper was delivered at a conference titled "Compensatory Options for Conserving Agricultural Land: A Research and Policy Conference," hosted by the Agricultural Issues Center in California. The article will be posted on the history section of the Resource Economics and Social Sciences Division Web site at a later date.

For more information, contact:

J. Douglas Helms  
Natural Resources Conservation Service  
202-720-3766  
[douglas.helms@usda.gov](mailto:douglas.helms@usda.gov)

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### **#3 Soil Characterization Data Available**

Soil characterization data produced by the NRCS National Soil Survey Center and associated profile descriptions are now available at <http://ssldata.sc.egov.usda.gov/>. Two query interfaces on the site provide information about pedons, the smallest natural three-dimensional volume of soil studied. The simple query interface uses the country, state, county, laboratory pedon number, soil survey site identification, or soil name to create a query to return the selected pedons. The advanced query interface adds project, site, and pedon information including latitude, longitude, and classification. The online help manual contains instructions on how to obtain reports. In July, the Web application had 1,069 unique visitors who downloaded 527 pages of reports per day.

For additional information, contact:

Thomas Reinsch  
National Soil Survey Center  
402-437-4179  
[thomas.reinsch@usda.gov](mailto:thomas.reinsch@usda.gov)

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### **#4 Hydrologic Modeling with GIS**

The National Water and Climate Center and the National Cartographic and Geospatial Center have jointly developed an ArcView Geographic Information System (GIS) interface to the NRCS WinTR-20 hydrologic model. The model is used to estimate watershed surface water runoff associated with single storm events. WinTR-20 is a version of the TR-20 model that operates in the Windows environment.

The GIS interface, named NRCS Hydro, was adapted from an ArcView GIS interface developed by the University of Maryland. NRCS Hydro requires three GIS data sets: a digital elevation model (DEM), digitized land use, and digitized soil data. DEM and land use data are available through the NRCS Lighthouse Data Gateway. Digitized soil data, which is available at certain locations, may be used with the interface.

A CD has been prepared for test distribution that includes the software system and complete GIS data for two locations. NRCS Hydro is being tested in six state offices to improve user-friendliness, technical operations, and a user guide. NRCS Hydro operates with ESRI ArcView 3.2 or 3.3 and the Spatial Analyst Extension.

WinTR-20 and associated information may be downloaded through the NWCC Web site: [www.wcc.nrcs.usda.gov/hydro](http://www.wcc.nrcs.usda.gov/hydro).

For more information, contact:

William Merkel  
National Water and Climate Center  
301-504-3956  
[William.Merkel@ea.nrcs.usda.gov](mailto:William.Merkel@ea.nrcs.usda.gov)

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## **TECHNOLOGICAL ADVANCES**

### **# 5 Sampling Dynamic Soil Properties to Promote the Soil Resource in National Parks**



Great Smoky Mountains National Park

The concepts of soil change and soil function are becoming integral to the National Park Service's (NPS) understanding of park soil resources. How soils are affected by human disturbances and how fast soils recover from those disturbances are important factors in managing the Nation's parks. However, this information is not currently included in soil surveys. The Soil Quality Institute, in cooperation NRCS soil scientists, is testing new sampling strategies on two soil surveys: Big Bend National Park (Texas) and the Great Smoky Mountains National Park (Tennessee and North Carolina). In addition to following standard soil survey procedures, soil scientists are gathering data on near-surface dynamic soil properties (e.g., bulk density, salinity, organic matter, aggregate stability, infiltration) to document the effects of past management on soil function.

The NPS plans to use this information to interpret resource assessments and monitoring data. This will enable them to better manage their soil resources and also educate park visitors about the importance of soils.

For more information, contact:

Arlene Tugel  
Soil Quality Institute  
505-646-2660  
[atugel@nmsu.edu](mailto:atugel@nmsu.edu)

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## **TECHNOLOGY TRANSFER**

### **#6 Manure and Water Quality Report Published**

NRCS staff members provided input and comments on a report entitled, “Manure Management and Water Quality: Costs to Animal Feeding Operations of Applying Manure Nutrients to Land.” It was recently published by the Economic Research Service as Agricultural Economics Report 824.

Clean Water Act requirements and USDA policy encourage producers to meet nutrient management standards when applying manure to land. The report's farm level analysis examines onfarm technical choices and production costs across major U.S. production areas. A regional analysis focuses on off-farm competition for land to spread surplus manure, including a Chesapeake Bay case study. A sector-wide analysis addresses potential structural adjustments at the national level and ultimate costs to producers and consumers.

The publication and briefing materials on its key findings are available at <http://www.ers.usda.gov/publications/aer824/>.

For more information, contact:

Peter Smith  
Resource Economics and Social  
Sciences Division  
202-720-2307  
[peter.smith@usda.gov](mailto:peter.smith@usda.gov)



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### **#7 Newsletter Features**

## Drought Solutions



Indian ricegrass.  
Courtesy of  
PLANTS database.

Want to learn how a Colorado rancher changed his operation to withstand drought? Check out the latest issue of Plant Solutions, the National Plant Materials Program's electronic newsletter. The issue shares insight from a Colorado landowner who planted more drought-hardy grasses and changed his rotational grazing system to make it through the dry years.

The issue also offers a look at wildfire revegetation efforts in the West, and features information on the potential for native, drought-tolerant Indian ricegrass to be grown for gluten-free flour.

Plant Solutions is emailed six times annually. It is available on the Plant Materials Program Web site and through list-serve subscription. Subscribe at <http://plant-materials.nrcs.usda.gov/eNews/>. Upcoming issues will include new agroforestry techniques and tips for enhancing rangelands.

For more information, contact:

Jody Holzworth  
National Plant Materials Program  
208-378-5740  
[Jody.Holzworth@id.usda.gov](mailto:Jody.Holzworth@id.usda.gov)

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## #8 Soil Survey Division Participates in Arid Soil Study

The Soil Survey Division was represented on a recent Arid Soils Study in South Africa and Namibia by Bob Engel, Soil Classification and Standards staff from the National Soil Survey Center. The study was organized by the Soil Science Society of South Africa (SSSSA) and the International Union of Soil Science (IUSS) Working Group on the World Reference Base for Soil Resources (WRB). The WRB is an international soil classification system similar to our Soil Taxonomy. The study included a field tour through the semi-arid and arid parts of Western South Africa and the arid coastal zone of Namibia.

About 30 other representatives from Australia, Belgium, Burkina Faso, Germany, Hungary, Italy, Namibia, the Netherlands, Republic of South Africa, Russia, Tanzania, and the United States participated. The purpose of the study and tour was (1) to get better insight in the diversity of soils in (semi-) arid regions, (2) to study land use practices on these soils (irrigation, water harvesting, ripping), (3) to test the application

of WRB on desert soils, and (4) to compare criteria between WRB and Soil Taxonomy and identify opportunities to better coordinate the two classification systems.

For more information, contact:

Bob Engel  
National Soil Survey Center  
402-437-5323  
[bob.engel@nssc.nrcs.usda.gov](mailto:bob.engel@nssc.nrcs.usda.gov)

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## TRAINING

### #9 Tools Available for Responding to Change

With the need for workforce planning due to an aging labor force, the evaluation of commercial outsourcing of jobs, and the pending NRCS reorganization of primarily institutes and regions, NRCS employees need to be aware of how to deal with multiple changes concurrently. The Social Sciences Institute has a variety of products, including technical reports, fact sheets, marketing guidebooks, and *The Leader in You* training tape program that can aid individuals in responding to change. These tools cover the topics of negotiation, collaboration, communications, leadership development, and change management. Some examples of the relevant fact sheet topics include: "Managing Change and Transition," "Stress Management," and "Alternative Dispute Resolution." Some examples of applicable topics in *The Leader in You* training tape program are "Stress Mastery" and "Change and Leadership."

The *People Partnerships, and Communities* fact sheet series, technical reports, and marketing guidebooks can be downloaded through the Social Sciences Institute Web site at <http://www.ssi.nrcs.usda.gov/>. Printed copies are available by calling 1-888-526-3227, ext. 2. To request a *The Leader in You* tape, e-mail [ssinter2@po.nrcs.usda.gov](mailto:ssinter2@po.nrcs.usda.gov) or call 616-942-1503.

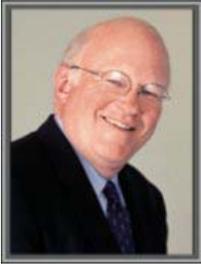
For more information, contact:

Frank Clearfield  
Social Sciences Institute  
336-334-7058  
[clearf@ncat.edu](mailto:clearf@ncat.edu)

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### #10 *The Leader in You* Seminar, "Excellence in Leadership and

## Management” Approaching



Ken Blanchard

Plan to join us for “Excellence in Leadership and Management,” a *The Leader in You* live satellite seminar, featuring internationally known author Ken Blanchard. This seminar supports the NRCS 2004 priority of implementing the President’s Management Agenda initiative—Strategic Management of Human Capital.

The program will broadcast on Wednesday, September 24, 2003, from 11:00 a.m. to 12:30 p.m. e.s.t. It will emphasize the keys to self leadership, effective management in a one-on-one context, and the elements of team and organizational leadership. Successful leadership begins when the leader can create a compelling vision that motivates people into action.

Ken Blanchard is chairman of The Ken Blanchard Companies, an internationally known consulting firm founded in 1979. He is co-author of *Gung Ho!* and *The One Minute Manager*, a management classic that has sold over 9 million copies since 1981 and has been translated into over 25 languages worldwide. Dr. Blanchard has been featured in *Time*, *People*, *U.S. News and World Report*, and on a variety of television programs.

Mark your calendars for other upcoming *The Leader in You* seminars! A customer service program entitled “Give ‘Em the Pickle!” featuring Bob Farrell will air on October 15 and speaker Joni Daniels will be featured on December 10, 2003, with her program entitled “Power Tools for Women!”

*The Leader in You* program, sponsored by the NRCS Social Sciences Institute and the NRCS National Employee Development Center, is designed to support the locally led conservation aspects of the Farm Bill. The National Association of Conservation Districts, National Association of State Conservation Agencies, National Conservation District Employees Association, and the Federal Training Network. The NRCS Federal Women’s Program and Earth Care Connection, USA are also cooperating sponsors of the Power Tools for Women! seminar.

For more information, contact:

Barbara Wallace  
Social Sciences Institute  
616-942-1503  
[Barbara.Wallace@usda.gov](mailto:Barbara.Wallace@usda.gov)

or

Sue Brooks

National Employee Development Center  
817-509-3245  
[Sbrooks@ftw.nrcs.usda.gov](mailto:Sbrooks@ftw.nrcs.usda.gov)

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## **NEW PERSONNEL APPOINTMENTS**

### **#11 New TSP Assignment**

Effective July 20, 2003, the TSP staff has been assigned to the Deputy Chief for Science and Technology.

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## **MEETINGS**

### **#12 Animal Residuals Conference to be Held**

The Water Environment Federation (WEF) will hold the Animal Residuals 2003 Conference in Arlington, Virginia on November 2-5. This conference serves as a vehicle to present information and exchange ideas on alternative technologies, innovative approaches, and responsive biosecurity measures. Through this conference, WEF plans to explore technology and implementation issues, economic and market development needs, environmental improvement opportunities, biosecurity issues and lessons learned.

The following link will lead to the Water Environment Federation's site that has posted the brochure and registration information for the conference. Federal sponsors of this conference include USDA-NRCS, the United States Department of Energy, and the United States Environmental Protection Agency.

<http://www.wef.org/pdffiles/2003%20Animal%20Res%20Bro.pdf>.

For more information, contact:

Glenn H. Carpenter, Ph.D.  
USDA-NRCS-AHCWPDP  
301-504-2212  
[glenn.carpenter@usda.gov](mailto:glenn.carpenter@usda.gov)

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NRCS Science and Technology Consortium staff should send information for **NRCS *Technology News*** to:

Barbara Wallace, Editor

Social Sciences Institute  
(616) 942-1503  
[barbara.wallace@usda.gov](mailto:barbara.wallace@usda.gov)

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