Soil Quality Institute

FY-03 BUSINESS PLAN

November 2003

Soil quality — Managing soil for today and tomorrow

USDA - Natural Resources Conservation Service

Soil Quality Institute Business Plan – FY03

The Soil Quality Institute will provide leadership in soil quality; build partnerships; and acquire, develop and transfer technology and information. The Institute will focus on issues that have national and multi-state applicability and are relevant to the field. It will strengthen technology delivery within NRCS by providing information and technical materials to state and field offices. It will be responsive to field needs and seek out emerging technologies for future incorporation into NRCS programs. Soil quality inventory, assessment, and management technologies will be developed for multiple scales including on-site, watershed and ecosystem/regional/national levels. Activities of the SQI will be carried out through collaborative efforts and partnerships with the research community, other federal and state agencies, land managers and NRCS state and field staff. Our vision, *"Soil quality as the foundation of a productive nation in harmony with a quality environment"* will lead us to look at soil quality for today and tomorrow.

Mission

Cooperate with partners in the development, acquisition and dissemination of soil quality information and technology to help people conserve and sustain our natural resources and the environment

Initiatives - FY 03

The following initiatives build the framework for the activities of the Soil Quality Institute. The desired outcomes discussed in the business plan reflect both short term and long term goals. Action items for FY 03 are described for each initiative.

1. **Technology Transfer and Training - Develop technical materials and provide training in the application of soil quality functions (sustain productivity; regulate water flow; filter and buffer potential pollutants; and store and cycle nutrients) to nutrient and pest management, buffers, tillage, grazing and pasture management and conservation planning.**

2. **Customer Delivery – Meet customer needs, including under-served customers, insure electronic accessibility of technical materials and solicit feedback on our products.**

3. **Technology Development for Soil Assessment - Develop science-based soil quality tools and guidelines for assessing, inventorying, and monitoring (NRI, CTA, SS, etc. programs) at multiple scales for conservation planning and performance measures.**

4. **Technology Development for Soil Management - Develop resource management approaches that improve or maintain soil quality and address the interaction of soil with other resources including water, air, plants, animals, and humans.**

5. **Building Partnerships - Collaborate with other institutes, centers, NRCS employees, agencies and the research community on soil quality.**

6. **Marketing for Stewardship - Enhance customer awareness of the importance of a healthy soil resource.**

Initiative 1. Technology Transfer and Training - Develop technical materials and provide training in the application of soil quality functions (sustain productivity; regulate water flow; filter and buffer potential pollutants; and store and cycle nutrients) to nutrient and pest management, buffers, tillage, grazing and pasture management and conservation planning

Background: Soil quality is about managing the soil for today and tomorrow. It is about maintaining or improving the soil's ability to function in support of productivity, the environment and human and animal health. The functions that soils perform – sustain productivity, regulate water flow, filter and buffer potential pollutants and store and cycle nutrients -- are fundamental considerations for nutrient and pest management, buffers, tillage, grazing and pasture management and conservation planning.

Desired Outcomes: NRCS field staff and partners will gain the knowledge of functions performed by soil, the ability to assess the condition of the soil and an understanding of the current knowledge of practices to improve the soil.

A. Develop and distribute technical materials on soil quality

	Action Items	Who	Target Date
1.	Develop set of Information Sheets for soil quality on Grazing Lands.	Norfleet	9/03
2.	Develop three Agronomy Technical notes on soil quality (continuous grazing vs. rotational grazing; SCI; and subsoiling).	Hubbs	9/03
3.	Develop two Agronomy Technical notes on organic farming and soil biology.	Lewandowski	9/03
4.	Develop two Agronomy Technical notes on soil quality (residue management and conservation tillage in colder climates).	Andrews	9/03
5.	Write an article for SWCS journal on SCI.	Norfleet/Hubbs	9/03
6.	Write an article for SSSA or SWCS journal on Soil Quality Index.	Andrews	9/03
7.	SARE PDP Soil Quality Website Project and collaboration with SWCS and ISU to further develop, test, and go online with the educational component to the site. Integrate this new site with SQI site.	Andrews/Lewandowski	9/03
8.	Update Soil Quality training course.	Hubbs/Andrews	9/03
9.	Develop outline for presentation to NEDC Board on Soil Quality II Course.	Hubbs/Andrews	7/03
10.	Provide assistance to NEDC on updating Soil Salinity Course.	Tugel	9/03
11.	Provide assistance to Soil Survey Division and NSSC on update of Soil Survey Manual. (soil function, dynamic soil properties)	Tugel	9/03

B. Provide training in soil quality

1.	Conduct training sessions on the Soil Quality Field Kit as requested.	Norfleet/ Hubbs/ Tugel/Andrews	On-going
2.	Work with states and NEDC as requested to deliver the soil quality course. (Courses are scheduled in FL, ID, KS, KY, MS, NE, NJ, PA, TN, WI)	Hubbs/Andrews	9/03
3.	Work with Joel Brown and others in the partnership to deliver workshops on Global Change.	Lewandowski	9/03
4.	Develop the soil quality course as a self-paced, stand alone training course on CD and the web.	Lewandowski	6/03
5.	Give soil quality presentations at pasture workshops in cooperation with ATTRA-Appropriate Technology Transfer for Rural Areas.	Hubbs	9/03
6.	Provide assistance to states as requested on Soil Conditioning Index.	Hubbs	On-going

Initiative 2. Customer Delivery – Meet customer needs, including under-served customers, insure electronic accessibility of technical materials and solicit feedback on our products

Background: Successful integration of soil quality into the programs of NRCS and with the land management systems of the country is dependent upon meeting customer needs. Our internal customers include NRCS employees who provide technical assistance, those who inventory the status and trend of our resources, those who survey soils and develop soil databases, and those who develop policy and programs. Our customers outside of NRCS include farmers, ranchers, conservation districts, land owners and managers, extension agents, and resource management consultants, and many state and federal agencies. A special emphasis will be placed on under-served individuals, groups and communities, including tribes.

Desired Outcomes: Our desired outcomes include effective communications and networking between the Soil Quality Institute and our customers that facilitate the identification of customer needs, encourage the mutual sharing of innovative solutions to resource problems, and provide feedback loops to insure quality products. Products will be in forms accessible by our customers.

Action Items **Who** **Target Date**

A. **Determine needs of under-served individuals and initiate projects to meet the needs**

1.	Update the Spanish version of the Soil Quality Test Kit Guide.	Lewandowski	9/03

B. Enhance electronic accessibility of all SQI technical materials, guidelines and publications

1.	Maintain and expand the Soil Quality Institute web home page, respond to requests sent to the webmaster, and maintain the SQIforum e-mail list.	Lewandowski	On-going
2.	Maintain new soil quality web site with SWCS.	Lewandowski	On-going
3.	Work with Minnesota state office and NRCS OTA liaison to develop a national NRCS web page with information for NRCS field staff and partners about conservation planning for organic producers.	Lewandowski	5/03

C. Develop mechanisms to solicit input and relay information to customers

1.	Attend National Organization of Professional Black NRCS Employees meeting in Arlington, Texas.	Norfleet	12/02
2.	Attend MO meetings, NRCS prof. employee meetings, farmer meetings, NCSS regional conferences, Conservation District conventions, and others.	All	On-going
3.	Maintain networks with regional Technology Specialists, state agronomists and SQ liaisons.	All	On-going

Initiative 3. Technology Development for Soil Assessment – Develop science-based soil quality tools and guidelines for assessing, inventorying, and monitoring (NRI, CTA, SS, etc. programs) at multiple scales for conservation planning and performance measures

Background: Today, in the 21st century, resource managers, policy makers and stewards of the land are asking questions about the status and trends in the quality of our soil resource base. Our customers want to know the current status or condition of the soil, whether the status is improving or declining, what the status should be, where the impaired soils occur in this country and how effective are agency programs at improving soil quality. NRCS currently has incomplete information to answer these questions. Techniques, tools and monitoring programs to answer these questions are needed at multiple scales to answer the questions that are relevant on-site, for a watershed, and for the ecosystem/regional/national levels.

Desired Outcomes: Indexes or some methods of measurement for soil quality that identify current condition and potential or desirable levels of certain features in healthy soils will be developed for two or more different scales. Appropriate field tools and techniques will be identified for use in inventory and assessment phases of conservation planning, national resource inventories and agency performance measures. Guidelines for interpretation of inventory and assessment data will accompany field tools and inventory protocols.

Action Items **Who** **Target Date**

A. Develop indicators, measures of soil quality and procedures for local assessment by land managers and field staff to determine the condition of the soil

1.	Continue testing the active soil carbon test and develop protocol for field use.	Andrews Tugel	9/03
2.	Continue testing and developing the LIBS method of soil carbon analysis	Norfleet	On-going
3.	Continue working with NSSC Soil Survey Standards Staff on development of Soil Microbiotic Crusts Protocols.	Tugel	9/03
4.	Collaborate with ARS Jornada Experimental Range to determine variance of soil carbon in rangeland systems for dynamic soil property sampling protocols.	Tugel	9/03
5.	Collaborate with ARS scientists in the Soils National Program 202 to further develop and refine the Soil Quality Index.	Andrews	9/03
6.	Complete the spreadsheet version of the Soil Quality Test Kit Interpretations Guide and accompanying journal article and tech note as appropriate.	Andrews	9/03
7.	Collaborate with UC Davis scientists to develop regionally appropriate indicator interpretations for the Soil Quality Test Kit.	Andrews	1/03

B. Develop inventory and monitoring protocols for watershed, regional and national assessment of soil quality in order to determine the status and trends of the health of the soil resource and to determine the effectiveness of programs for soil quality enhancement

1.	Develop protocols for assessing and monitoring soil quality at various scales using EPIC, Century and other models.	Norfleet/Andrews	9/03
2.	Develop monitoring protocols for sampling soil carbon as part of a Carbon Sequestration Program.	Norfleet	12/03
3.	Coordinate with Alabama-NRCS and Auburn University on write up for hyper-spectral photo interpretations analysis.	Norfleet	9/03
4.	Analyze and determine how the soil biology data from the MLRA 9 Project	Andrews	9/03

	Study can be used to develop indicators for soil quality.		
5.	Develop monitoring protocols for Bare Soil Assessment using Remote Sensing Techniques. A joint project with U.C. Davis.	Norfleet	9/03

C. Develop strategies with the NSSC to include soil quality parameters in soil survey activities and databases

1.	Participate in the Jornada-Holloman dynamic soil property study on rangelands in collaboration with ARS and NSSC.	Tugel, Norfleet	9/03
2.	Continue development of Dynamic Soil Properties protocols for two soil survey projects (Big Bend National Park – TX and Smokey Mountains National Park – TN).	Tugel/Hubbs	9/03
3.	Co-author poster with Herrick on "Criteria for selecting dynamic soil properties for soil survey" and paper with Stingham on "State and Transition models".	Tugel	11/02

Initiative 4. Technology Development for Soil Management - Develop resource management approaches that improve or maintain soil quality and address the interaction of soil with other resources including water, air, plants, animals, and humans.

Background: Conserving and enhancing soil quality are fundamental first steps to sustained long-term resource use that is in balance with economic and environmental needs. Soils perform numerous functions to support resource uses including agriculture, livestock grazing, forestry and urban development as well as wildlife and wetland resources. Soils support biological processes such as plant growth and microbial activity; help distribute the flow of water through the landscape; filter, transform, immobilize, buffer and break down organic and inorganic materials such as municipal and animal wastes; and store and cycle nutrients and other compounds such as carbon dioxide. When we improve soil quality we are improving the ability of the soil to function.

Desired Outcomes: Ecosystem-based technologies, soil building practices and systems that improve and maintain healthy soils and that are in balance with economic and environmental needs are established. Technical assistance delivery for conservation planning will incorporate considerations of the effects of conservation practices and systems on soil quality. Adaptive management strategies that encompass practice effects evaluation and practice or system modification will be developed and incorporated into NRCS technical guides.

Action Items **Who** **Target Date**

A. Examine the effect of management practices on soil in order to monitor the effectiveness of conservation practices in improving or maintaining soil health

1.	Collaborate with NMSU on literature search and soil analyses to determine effect on soil quality of irrigation in arid regions	Tugel	6/03
2.	Collaborate with TACD, Robertson County SWCD, and TN NRCS on soil quality/carbon project evaluating management practices effects on soil quality/carbon.	Hubbs	9/03
3.	Collaborate with ARS and Auburn University to sample the Old Rotation for management effects on soil quality.	Hubbs/Norfleet	9/03
4.	Collaborate with NRCS in Louisiana to sample the soils on the Jay Hardwick Farm for determination of management effects on soil quality.	Hubbs/Norfleet/ Andrews	6/04
5.	Develop a rough draft for a Biology Primer II in cooperation with SWCS.	Lewandowski/Tugel /Andrews	9/03

6.	Collaborate with the Social Sciences Institute to develop an information sheet based on the results of soil quality focus groups.	Andrews	9/03
7.	With ARS scientists at NSTL, develop journal article on the use of ecological systems approaches to agricultural research, management and education.	Andrews	3/03

INITIATIVE 5. Building Partnerships - Collaborate with other institutes, centers, NRCS employees, agencies and the research community on soil quality.

Background: The Soil Quality Institute is located in Ames, Iowa, Auburn, Alabama, Corvallis, Oregon, Las Cruces, New Mexico, and St. Paul, Minnesota. This distributed structure facilitates our access to the research community as well as to the many regional soil quality concerns of this country. Potential partners at these five locations include Iowa State University, Auburn University, Alabama A&M, Tuskegee University, New Mexico State University, University of Minnesota, Oregon State University, Agricultural Research Service (National Soil Tilth Lab, National Soil Dynamics Lab, National Forage Seed Production Lab, Jornada Experimental Range), U.S. Forest Service, Environmental Protection Agency, and Cooperative Extension Service.

Desired Outcomes: Our desired outcome is a strong collaborative relationship with the research community that fosters reciprocal expression of technology and research needs and partnership ventures in technology acquisition, development and transfer. We will have an expanded network that reaches beyond the communities of our host locations to address the wide variety of soil quality needs that reflect the diverse and complex nature of soils, climates, land uses and cultures in this country.

Action Items **Who** **Target Date**

A. Network with soil quality researchers and practitioners to identify common goals and opportunities for collaboration

1.	Make presentations about soil quality and the Soil Quality Institute to local, state, and regional groups	All	On-going
2.	Attend conferences such as Ecology Society of America, SWCS, Beltwide Cotton Conference, Iowa GIS and GPS, Southeast No-till meeting, Society for Range Management meeting, and ASA annual convention. Present papers and SQI exhibit.	All	On-going
3.	Display SQ Institute Exhibit and hand out Rangeland SQ Information Sheets at the National Society for Range Management annual meeting.	Tugel	On-going
4.	Attend Institute Directors Meetings and Agency Business meeting as opportunities arise.	Director	On-going
5.	Make oral presentation on Advancing the Science of Soil Change at the 2002 ASA Annual meeting.	Tugel	11/02
6.	Coordinate Dynamic Soil Properties Symposium (ASA Annual Mtg.) and prepare summary paper.	Tugel	9/03

Initiative 6. Marketing for Stewardship - Enhance customer awareness of the importance of a healthy soil resource base

Background: Soil health and soil quality are reflected in the time honored concept of stewardship for the land. Now more than ever, it is important to manage our soil resource wisely. Global population growth, improving economies, and freer trade will increase the market for American products. These increased demands on our soil to produce may place marginal or fragile lands at risk, and result in abusive management of existing highly productive lands.

Desired Outcomes: Informed soil quality practitioners, knowledgeable policy makers, and a foresighted public are a part of the country's future and fundamental to the attainment of the soil quality goals of the agency.

	Action Items	**Who**	**Target Date**
1.	Develop a Conservation Practice Primer that links Farm Bill Programs to conservation practices that improve soil quality.	Norfleet	4/03
2.	Update the SQI exhibit and add variations suitable for urban, tropical, and other audiences. Make available on the web site.	Lewandowski	On-going
3.	Regularly submit news items to Technology News, NRCS This Week, and other outlets.	Lewandowski	On-going