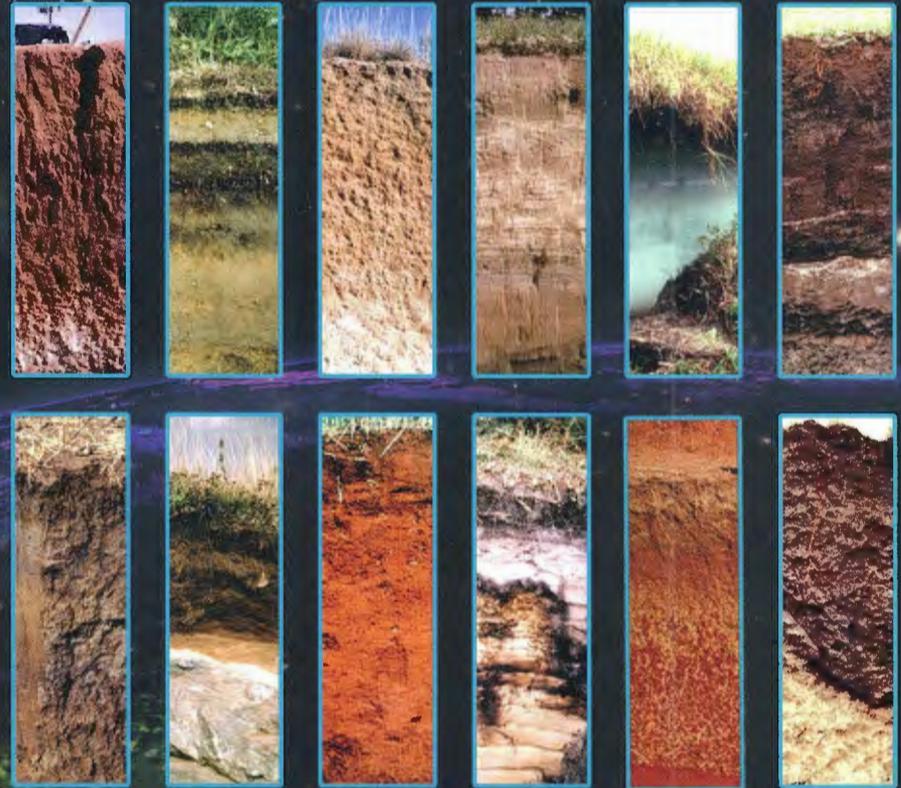


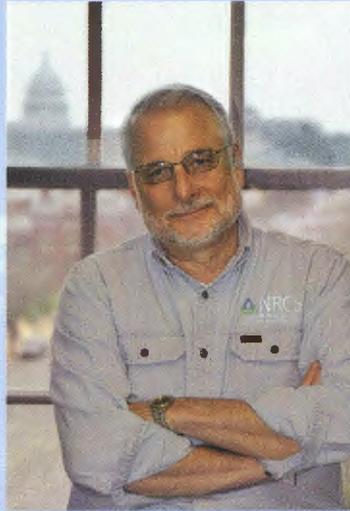
Natural Resources Conservation Service and Soil Science Society of America

Soil Scientists Around the World: Making a Difference



75 Years—A Legacy of Conservation

The 2011 Soils Planner is dedicated to the international work of the National Cooperative Soil Survey (NCSS) and soil scientists around the world. NCSS is a nationwide partnership of Federal and State agencies, universities, and professional societies that cooperatively investigate, inventory, document, classify, interpret, disseminate, and publish information about soils of the United States and its trust territories and commonwealths. The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) provides leadership and coordination to NCSS, operates and provides access to the NCSS soil inventory, and works to extend soil survey technology to global applications.



NRCS and other soil scientists in the field use their knowledge to conserve and improve productive lands and address emerging issues such as land degradation and climate change, as the many examples in the 2011 Soils Planner show. In the coming year, NRCS will take additional steps to bring soil science and survey technology to new parts of the world and to work with international colleagues to harmonize classification systems to create a universal soil taxonomy.

Dave White
Chief, USDA-Natural Resources Conservation Service
<http://www.nrcs.usda.gov>

“Helping people help the land” and using soil science to improve conservation worldwide are historically important goals for NRCS. Hugh Hammond Bennett, the agency’s first Chief, believed that our ability to use soil conservation methods could be “increased by an investigation of conditions in other countries with longer agricultural histories.” Through *Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys*, NRCS has provided leadership in creating a taxonomy for analyzing soils worldwide. To access the NCSS U.S. soil inventory at State, county, and community levels, go to www.soils.usda.gov and click on “Web Soil Survey;” for information on NRCS’ international soils work, click on “World Soils.”

Soil Science Footprints: 75 years of SSSA

The Soil Science Society of America (SSSA) is an international scientific society that fosters the transfer of knowledge and practices to sustain global soils, advances the field of soil science, and connects members around the world. SSSA currently has nearly 6,000 members in over 80 countries.

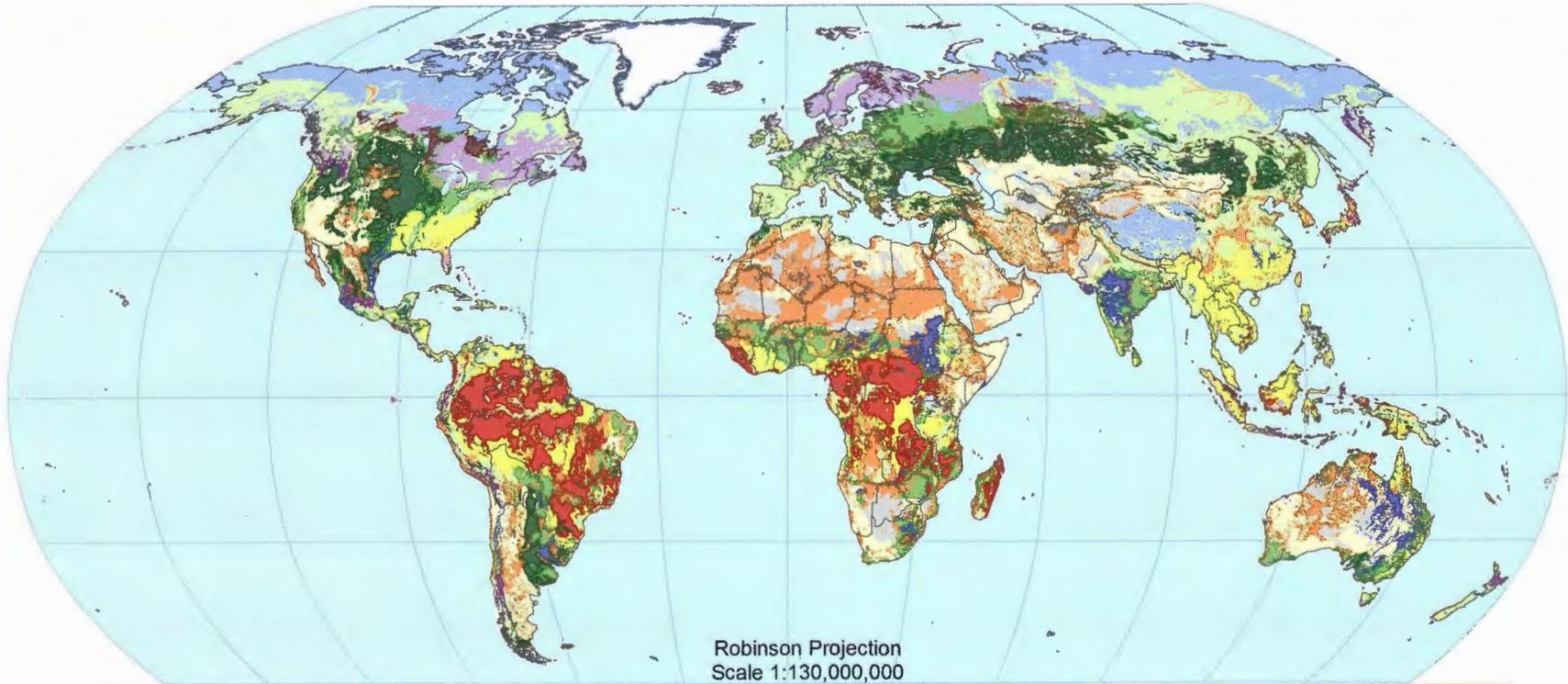


To communicate changes in soil science research, the Society publishes or co-publishes several peer-reviewed journals, including *Soil Science Society of America Journal*, *Journal of Environmental Quality*, *Vadose Zone Journal*, and *Soil Survey Horizons*. SSSA has a robust Web site and develops a variety of publications, including monograph and book series and topical book titles. Through its Science Policy Office in Washington, D.C., SSSA is an active participant in policy discussions related to soil and soil science. In addition, SSSA manages a professional certification program for Certified Professional Soil Scientists and Certified Professional Soil Classifiers.

SSSA commemorates its 75th anniversary in 2011. A year-long celebration with a variety of outreach activities and multimedia projects is planned, culminating with special events at the 2011 SSSA Annual Meeting in San Antonio, Texas, October 16–20, 2011. During this anniversary year, we hope to remain true to these words written by the SSSA Historian J. Fulton Lutz in 1977, “The history of the Soil Science Society of America is a history of dedicated soil scientists working independently and collectively to enhance our knowledge of soils.”

Charles W. Rice
President, Soil Science Society of America
<http://www.soils.org>

Global Soil Regions



Soil Orders

 Alfisols	 Entisols	 Inceptisols	 Spodosols	 Rocky Land
 Andisols	 Gelisols	 Mollisols	 Ultisols	 Shifting Sand
 Aridisols	 Histosols	 Oxisols	 Vertisols	 Ice/Glacier

Soil Taxonomy



Gelisols - Soils with permafrost within 2 meters of the surface.



Andisols - Soils formed in volcanic ash.



Aridisols - Soils of arid environments with subsurface horizon development.



Alfisols - Moderately leached soils with a subsurface zone of clay accumulation and >35 percent base saturation.



Histosols - Organic soils.



Oxisols - Intensely weathered soils of tropical and subtropical environments.



Ultisols - Strongly leached soils with a subsurface zone of clay accumulation and <35 percent base saturation.



Mollisols - Grassland soils with high base status.



Spodosols - Acid forest soils with a subsurface accumulation of metal-humus complexes.



Vertisols - Clayey soils with high shrink/swell capacity.



Inceptisols - soils with weakly developed subsurface horizons.



Entisols - Soils with little or no morphological development.

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Rwanda—Africa

East and Central African countries are moving toward increased cooperation through a regional approach to adaptation strategies in their effort to cope with accelerating climate change. Maxine Levin, an NRCS soil scientist, received a 2008 U.S. Embassy Science fellowship to conduct a feasibility study in Kigali, Rwanda, to build a virtual regional biodiversity center. The Government of Rwanda accepted her recommendation to develop an integrated geographic database combining soil survey, climate, vegetation, and biological diversity for habitat analysis and to develop a data sharing policy. The database will aid in conservation and climate change mitigation efforts.



Agriculture is maintained on extremely steep slopes.



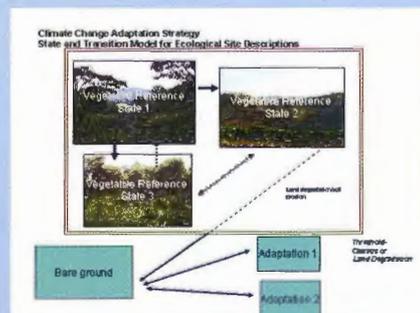
The Virunga Mountains—home of mountain gorillas featured in “Gorillas in the Mist: The Story of Diane Fossey” (1988).



Potato farming edges up against protected forest habitat for gorillas and golden monkeys.



Fertile soil in bottomlands is used for organic vegetable gardens.



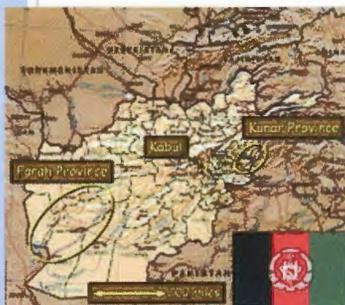
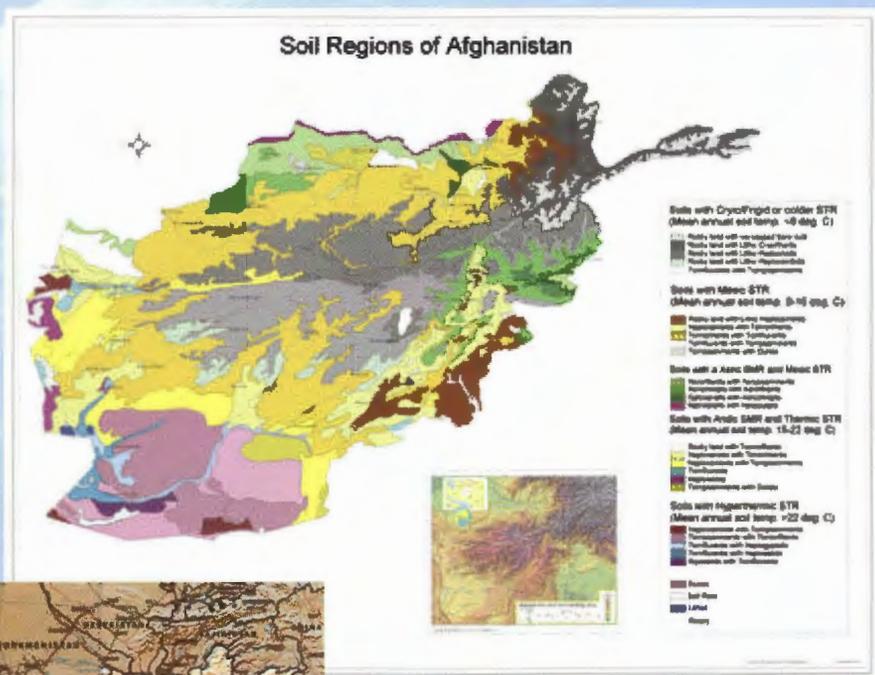
Climate change adaptation strategies use a state-and-transition model based on ecological site descriptions.

FEBRUARY 2011

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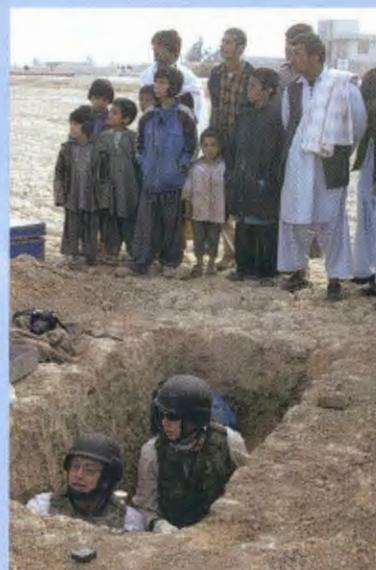
Afghanistan—Central Asia

Agriculture is the main source of income for the Afghanistan economy. Despite the fact that only 12 percent of Afghanistan's total land area is arable and less than 6 percent is cultivated, more than 80 percent of Afghanistan's population is involved in farming, herding, or both. USDA is helping Afghanistan through a variety of activities aimed at rebuilding agricultural markets and improving management of natural resources. The NRCS—Soil Survey Laboratory (NRCS-SSL) is conducting soil surveys, teaching local nationals about soil and water conservation, and building capacity in Afghanistan's agricultural sector.



Map of Afghanistan showing general area of soil sampling.

Map of Afghanistan showing soil sampling sites.



Ed Tallyn (front) and Jason Nemecek (back) in soil pit with local nationals looking on in Farah Province.



Typical Farah landscape, with citadel built by Alexander the Great around 325 BC.



Bruce Dubee (left) and Jason Nemecek (right) with local children observing map of Afghanistan showing soil sampling sites.

Note: Ed Tallyn, Jason Nemecek, and Bruce Dubee are USDA field soil scientists who sampled soils in several provinces of Afghanistan. They taught local nationals about soil and water conservation, and techniques for describing a soil. They also promoted capacity building of the agricultural sector in Afghanistan last year as part of USDA's effort to support the Afghanistan military campaign, Operation Enduring Freedom.

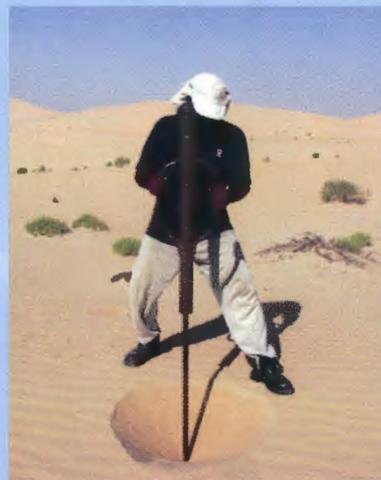
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Iraq and United Arab Emirates— Middle East

In 2008, USDA helped facilitate two workshops in which Iraqi soil scientists discussed issues related to agricultural soil and water programs with relevant Iraqi ministries. The goal was to initiate actions to prevent erosion and improve water quality. The workshops concentrated on gypsiferous soils, which occur primarily in Iraq and parts of the southwestern desert in the United States.

In 2008, NRCS soil scientists provided a technical review of the soil survey for the United Arab Emirates, which became available in 2010.



Hand augering in sand dunes is hard work.(United Arab Emirates).



Landscape of irrigated agriculture on gypsiferous soil in Iraq.



Soil surface crusting—a problem in irrigation.



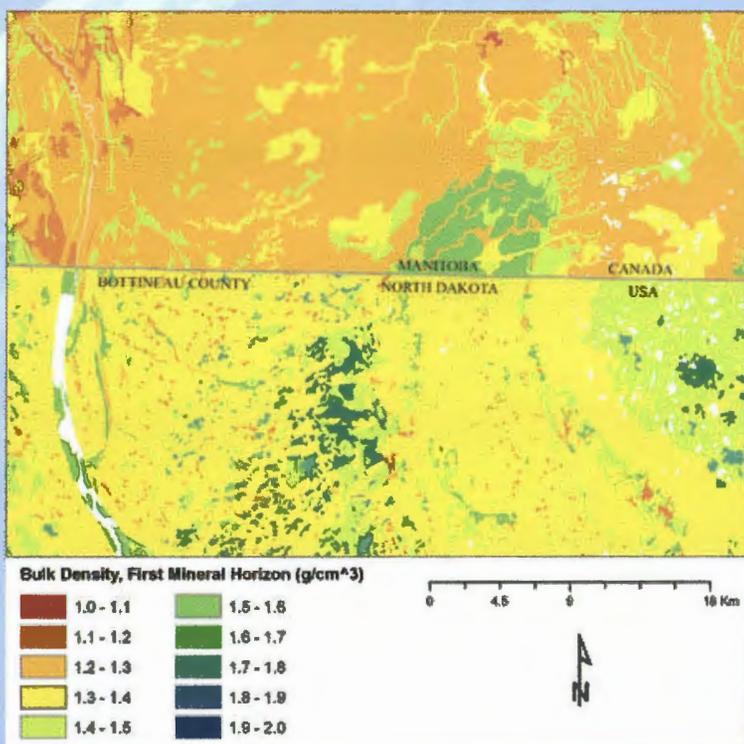
Sand dunes in United Arab Emirates.

APRIL 2011

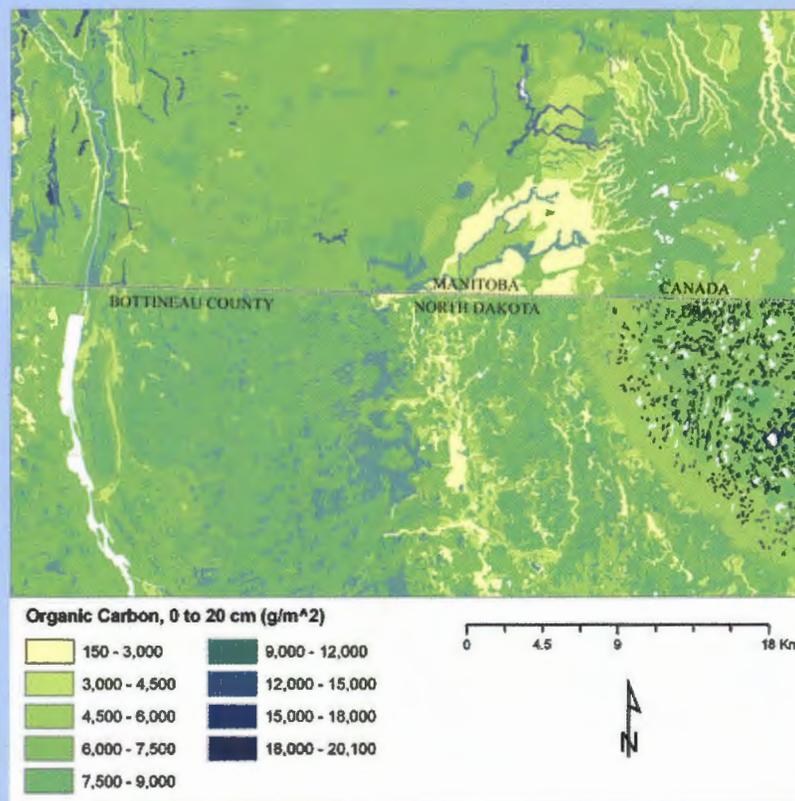
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Canada—North America

NRCS and West Virginia University host the North American node for the GlobalSoilMap.net project, a consortium creating a global digital soil map using state-of-the-art technologies. Several digital soil mapping projects are ongoing along the North Dakota and Manitoba borders, thanks to the partnership of Agriculture and Agri-Food Canada (AAFC) and the Canadian Soil Information Service (CanSIS). The global soil map will help promote better decisions on global issues such as food production and hunger eradication, climate change, and environmental degradation.



Map of soil bulk density using gridded soils information of the border between Canada and the United States.



Map of soil carbon using gridded soils information of the border between Canada and the United States.



globalsoilmap.net
network map

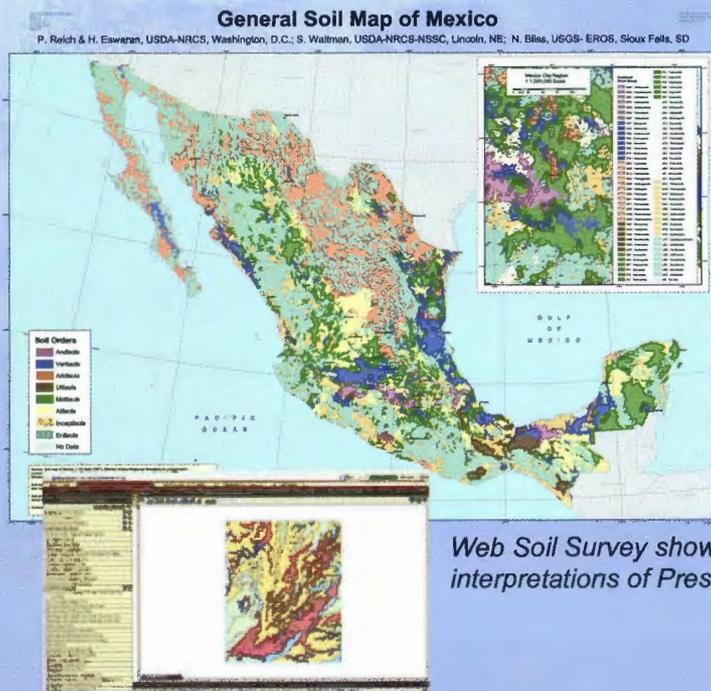
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Mexico—North America

In 2009, NRCS converted a soil survey of Presidio el Jabali, Mexico, into U.S. soil taxonomy for the Food and Agriculture Organization of the United Nations (FAO). The area now uses the Web Soil Survey legend, descriptions, tables, reports, maps, and soil interpretations for conservation planning of ecological restoration.

Dr. Juan Manuel Torres Rojo, Director General for Mexico's National Forestry Commission (CONAFOR), invited the NRCS Soil Survey Division to collaborate in a series of workshops to assist Mexico in the assessment and restoration of degraded ecosystems. USDA's soil taxonomy and ecological site descriptions will be used to assist Mexico in identifying the appropriate conservation practices and vegetation types for restoration and reforestation.



FAO General Soil Map of Mexico.

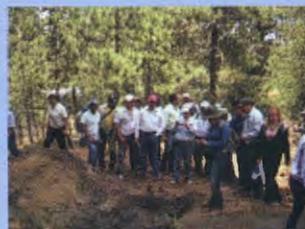
Web Soil Survey shows soil interpretations of Presidio el Jabali.



Jacinto Samuel Garcia Carreon, lead soil scientist for CONAFOR, determining horizons in a soil pit north of Guadalajara, Mexico.



NRCS soil scientists Dr. Thomas Reinsch and Wayne Gabriel, describing a forest volcanic soil pedon north of Guadalajara (Nevado de Colima).



CONAFOR specialists gathered around Playa Lake describing a soil pit.

JUNE 2011

China—Asia

NRCS soil scientists Mike Wilson and John Kelley and Ming Chen (then at the University of Florida, Gainesville) traveled to China in 2002 on a technical exchange study tour. They visited several Chinese universities and government agencies focusing on soils and agriculture. As part of the technical exchange with professors at South China Agricultural University, they collected soil samples in Guangdong Province in south-eastern China.



Soil profile sampled by South China Agricultural University and NRCS measuring soil properties in a highly manipulated, cultivated rice paddy landscape.



Soil sampling in Guangdong Province in southeastern China.

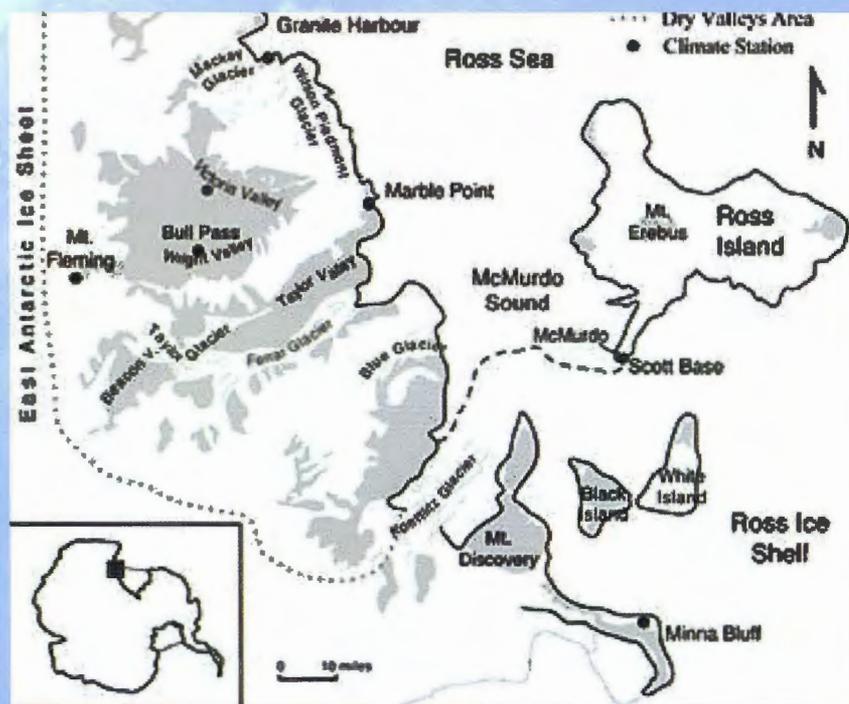


Rice paddy landscape and soil pit in Guangdong Province.

JULY 2011

Antarctica—Soil Climate in the Polar Regions

NRCS soil scientists have been involved in a cooperative soil climate monitoring project in the McMurdo Dry Valleys and other ice-free areas of the Ross Island Region of Antarctica since 1999 through the Global Climate Change Program. The cooperative link was established because soils in polar regions are thought to be particularly sensitive to climate change. Currently, seven soil climate stations in Antarctica monitor ambient atmospheric parameters, soil moisture, and soil temperature. They are part of an international cooperative project led by Landcare Research, Hamilton, New Zealand, and supported by Antarctic New Zealand in Christchurch.



Map of the Ross Sea region of Antarctica showing the locations of the seven soil climate stations.



The McMurdo Dry Valleys is a large ice-free area (about 6,000 square kilometers) along the western coast of the Ross Sea.



NRCS soil scientist, Cathy Seybold adjusts moisture sensor at Mt. Fleming, Antarctica.

AUGUST 2011

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Spain—Europe

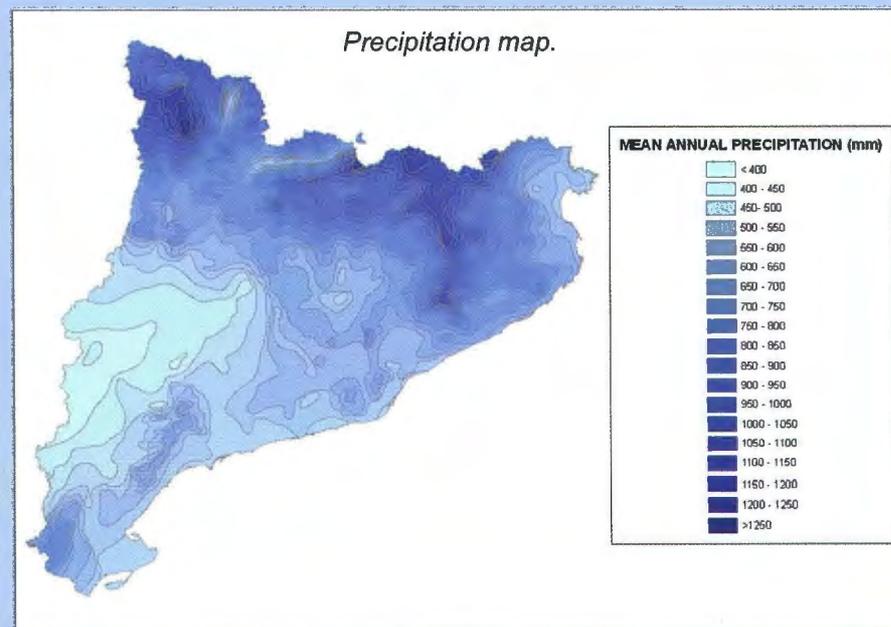
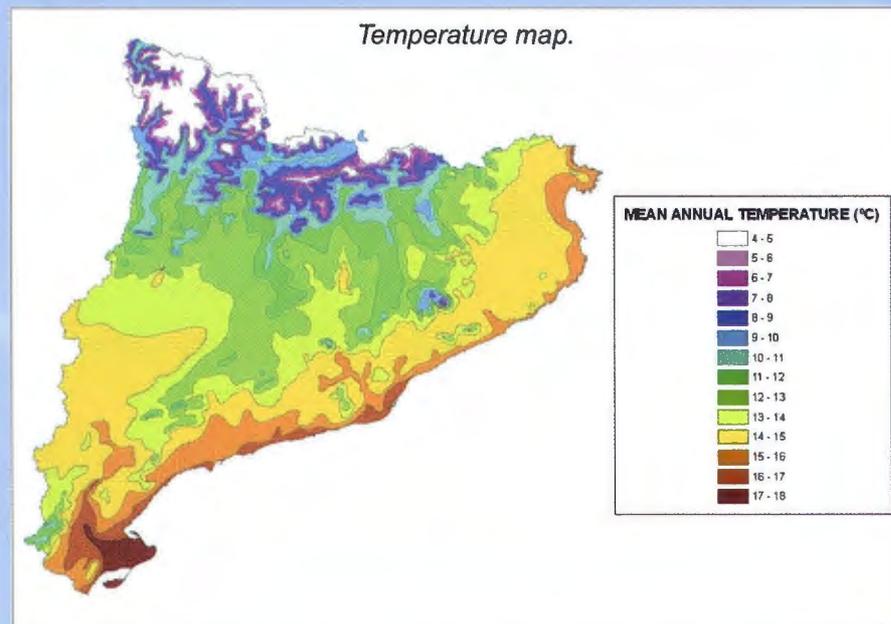
A detailed soil survey of Catalonia, Spain, was undertaken in 1984 by the Departament d'Agricultura, Alimentació i Acció Rural (DAR) of the Generalitat de Catalunya. Working at a scale of 1:25,000, the survey used the U.S. system of soil taxonomy at the series level. The criteria used to define the more than 500 soil series in Catalonia are the following: parent material, effective depth, drainage class, textural class, content of gypsum and carbonate, and horizon thickness. The University of Catalonia would like to increase its knowledge of moisture and temperature regimes and ecological sites with the soil survey and has begun a workshop study with NCSS scientists.



Landscape of Catalonia.



Landscapes and olive orchards of Catalonia.



SEPTEMBER 2011

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Thailand and Vietnam—Southeast Asia Coastal Protection With Mangrove Restoration

Mangrove reforestation is an important community adaptation strategy in Thailand and Vietnam for addressing sea level rise, coastal erosion, and fisheries' nursery restoration. As part of a U.S. Embassy Science Fellowship in Thailand, NRCS provided information on the Conservation Reserve Program and the Wetlands Reserve Program as excellent examples of incentive payments to encourage private landowners to invest in coastal and river forest buffer restoration. In addition, NRCS determined that the study of subaqueous soils with carbon measurements in these coastal systems has potential to identify adaptive solutions to land change in these sensitive and highly productive lands. Vietnam is also considering plans for dikes and canals in the Mekong Delta to control rice land irrigation, salt water intrusion, flooding, sediments, water quality, and drought/low flow/dam release from upstream sources as well as coastal erosion and sea level rise.



Satellite image of the Bay of Thailand.

Mangrove seedlings for planting.



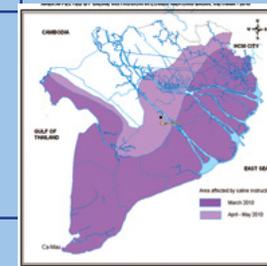
Mangrove restoration in the Bay of Thailand.



Coastal mangrove restoration near Hue, Vietnam.

OCTOBER 2011

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Map of salt intrusion, Lower Mekong Delta Region in Southern Vietnam.

Chile—South America

For a 2008 international soil taxonomy workshop hosted by the University of Chile, the NRCS Soil Survey Laboratory assisted in a workshop field trip by sampling the soils and providing analyses of the soil horizons. For example, the Quillayes series with indurated horizons was sampled to represent a shallow soil formed in volcanic parent material and used for viticulture. Lessons learned from this area may be applied to similar volcanic Mediterranean climatic regions in Northern California in the United States.



Vineyard in Chile.



International participants in the University of Chile soil taxonomy workshop investigate a backhoe pit near a vineyard.



Shallow volcanic soils reveal indurated layers.

NOVEMBER 2011

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	<i>Soils of the Quillayes series in Chile are shallow, well drained, and suited to vineyards.</i>	1 	2	3	4	5																																																																																											
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27	28	29	30	Thanksgiving Day	<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p style="text-align: center; margin: 0;">October 2011</p> <table border="1" style="font-size: small; width: 100%; text-align: center;"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td></tr> <tr><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr> <tr><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td></tr> <tr><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td></tr> <tr><td>30</td><td>31</td><td></td><td></td><td></td><td></td><td></td></tr> </table> </div> <div style="width: 48%;"> <p style="text-align: center; margin: 0;">December 2011</p> <table border="1" style="font-size: small; width: 100%; text-align: center;"> <tr><td>S</td><td>M</td><td>T</td><td>W</td><td>T</td><td>F</td><td>S</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td>1 2 3</td></tr> <tr><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td></tr> <tr><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td></tr> <tr><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td></tr> </table> </div> </div>		S	M	T	W	T	F	S							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						S	M	T	W	T	F	S							1 2 3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
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Australia, World Soil Congress 2010, Universal Soil Classification

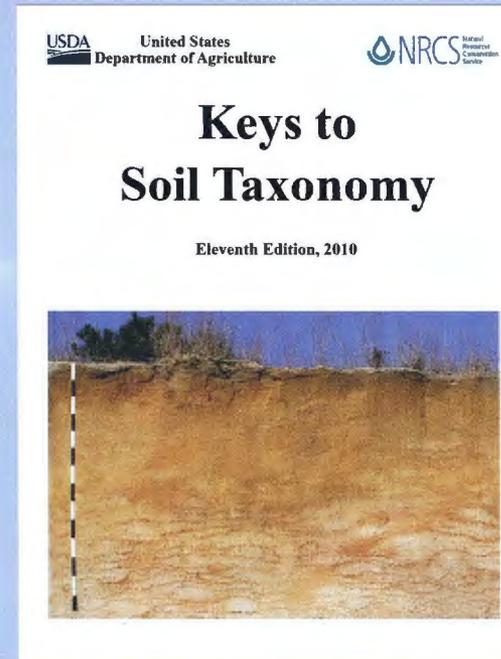
A new International Union of Soil Scientists (IUSS) committee has been formed to mediate a harmonization of the U.S. soil classification system (Soil Taxonomy), the European Commission World Reference Base (WRB), and the legacy FAO system into a universal soil classification. Criteria for a global system are:

- the relevance of the soil characteristics for environmental and management functions;
- the availability of soils information (legacy and modern); and
- the ability to map soil characteristics at a scale of 1:250,000 or smaller.

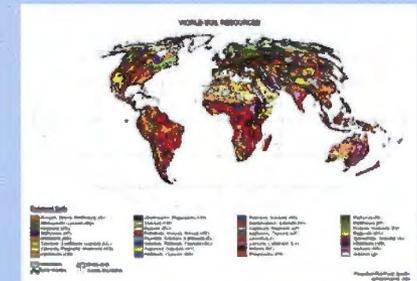
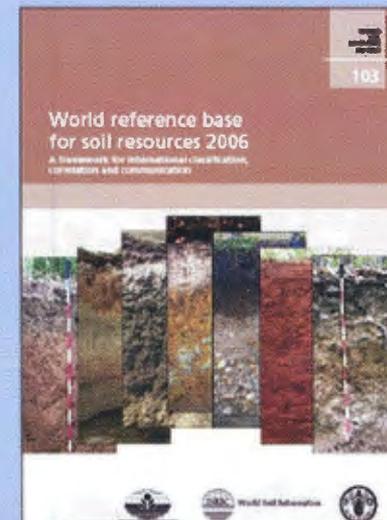
Ultimately, this will further the goal of soil scientists working together across the globe to “make a world of difference.”



Scientists from around the world compare classification systems for completeness.



Keys to Soil Taxonomy 2010.



Food and Agriculture Organization-United Nations Educational, Scientific and Cultural Organization Legend of the Soil Map of the World (SMW).

European Commission-World Reference Base (WRB).

DECEMBER 2011

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<p>Christmas Day</p>			<p>Landscape of Vertisol in Darling Downs, Australia.</p>		<p>Water harvesting in heartlands of Australia.</p>	<p>New Year's Eve</p>																																																																																					

January

January 4–8, Google Earth: Visualizing the Possibilities for Geoscience Education and Research, Google Inc. Headquarters (GooglePlex), Mountain View, California

January 11–13, Advances and Innovations in Environmental Site Characterization, Sampling, Monitoring, and Remediation Technology, 2011 North American Environmental Field Conference and Exposition, San Diego, California

January 24–27, Recent Advances in Understanding Production, Transfer, and Burial of Terrestrial and Marine Materials on the Earth Surface, American Geophysical Union (AGU) Chapman Conference, Oxnard, California

February

January 30–February 2, National Association of Conservation Districts (NACD) Annual Meeting, Nashville, Tennessee

February 6–10, Society for Range Management (SRM) Annual Meeting, Billings, Montana

February 10–13, Maryland Association for Environmental and Outdoor Education (MAEOE) Annual Conference: Educating for Sustainability, College Park, Maryland

March

March 6–9, Global Conference on Entomology, Chiang Mai, Thailand

March 21–25, Climates, Past Landscapes, and Civilizations, AGU Chapman Conference, Santa Fe, New Mexico

April

April 2–8, Diverse Rangelands for a Sustainable Society, Ninth International Rangeland Congress, Rosario, Argentina

April 9–13, American Planning Association 2011 National Planning Conference, Boston, Massachusetts

April 26–29, National Ecosystem and Mitigation Banking Conference, Baltimore, Maryland

May

May 2–6, Coastal Sediments '11: Bringing Together Theory and Practice, Miami, Florida

May 2–13, United Nations Commission on Sustainable Development, 19th Session (CSD-19), New York, New York

May 24–27, National Cooperative Soil Survey (NCSS) Conference, Asheville, North Carolina

June

June 6–10, 12th International Symposium on Soil and Plant Analysis (ISSPA), Mediterranean Agronomic Institute of Chania, Crete, Greece

June 27–29, Sixth International Conference: Climate Change—The Karst Record, Birmingham, United Kingdom

July

July 11–14, International Symposium on Soil Organic Matter 2011: Organic Matter Dynamics—From Soils to Oceans, Leuven, Belgium

July 16–20, Soil and Water Conservation Society (SWCS) Annual Conference, Washington, D.C.

August

August 1–5, National Conference on Ecosystem Restoration (NCER 2011), Baltimore, Maryland

August 7–12, Ecological Society of America (ESA) Annual Meeting: Planetary Stewardship—Preserving and Enhancing Earth's Life-Support Systems, Austin, Texas

September

September 18–22, Soil Science in a Changing World: First Wageningen Conference on Applied Soil Science, Wageningen, The Netherlands

October

October 5–9, International Conference of the Soils of Urban, Industrial, Traffic, Mining, and Military Areas (SUITMA) Working Group of the International Union of Soil Science (IUSS), Marrakech, Morocco

October 9–12, Geological Society of America Annual Meeting, Minneapolis, Minnesota

October 16–19, American Society of Agronomy-Crop Science Society of America-Soil Science Society of America International Annual Meetings, San Antonio, Texas

November

November 10–12, American Indian Science and Engineering Society (AISES) National Conference, Minneapolis, Minnesota

December

December 5–9, American Geophysical Union 2011 Fall Meeting, San Francisco, California

Helping People Help the Land 2012

January

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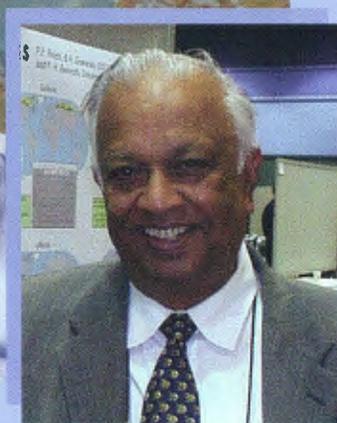
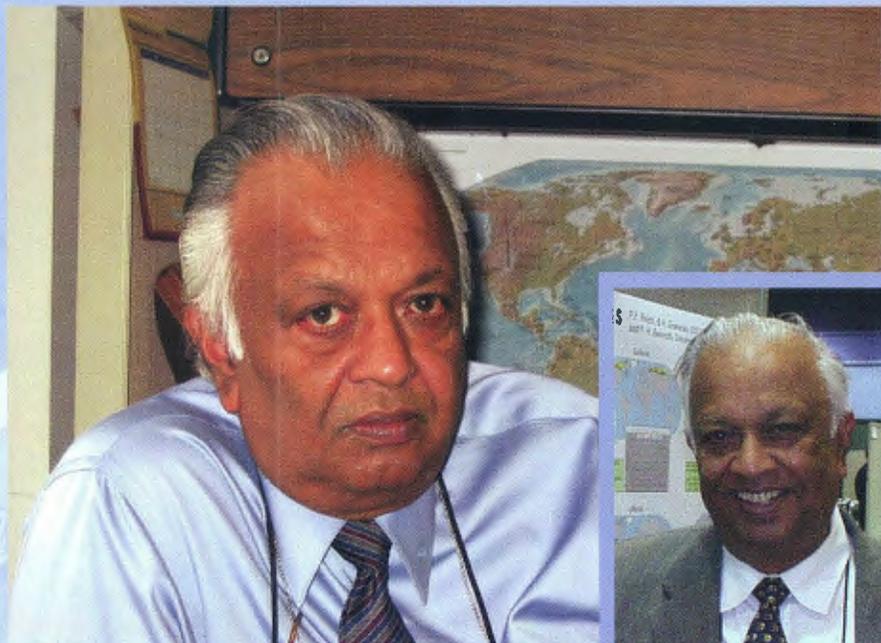
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This 2011 Planner is dedicated to the work of the NRCS World Soil Resources staff led by Dr. Hari Eswaran, who retired June 30, 2010, after 21 years of service.



Dr. Hari Eswaran

Photos and References

All photos are from the NRCS Soil Survey Division photo library.

Quote from Hugh Hammond Bennett, Chief of USDA Soil Conservation Service, from Bennett, *Soil Conservation* (New York: McGraw-Hill, 1939), p. 54.

Quote from J. Fulton Lutz, *History of the Soil Science Society of America Soil Sci Soc Am J* 1977 41: 152-173.

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