About this Report

This annual report was prepared by the International Programs Division (IPD) of the Natural Resources Conservation Service (NRCS), which is an agency of the U.S. Department of Agriculture (USDA). The report covers the period from October 1, 2018, to September 30, 2019 (fiscal year 2019).

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Executive Summary

NRCS IPD facilitated activities in support of U.S. agricultural and foreign policy interests that promote the advancement of science and technology, address food security, strengthen developing economies, and encourage the sustainable management of natural resources.

In fiscal year (FY) 2019, NRCS participated in 25 international engagements (compared to 28 in FY–2018) and strengthened the bilateral relationship with 14 individual countries.

NRCS staff undertook 23 international travel assignments to explore and improve conservation efforts in support of USDA and agency priorities. Scientific engagement and collaboration remained strong and accounted for most trips. Activities included attending a conservation policy meeting on the Lake Huron Lake Action and Management Plan with Canada, participating in the World Congress of Soil Science in Brazil, and influencing perspectives by speaking at conferences in Australia (soil health) and China (black soils).

Agency experts also provided technical assistance by serving as instructors during soil fertility and irrigation workshops in Pakistan, building capacity in digital soil mapping in Columbia, conducting a workshop on the use of digital soil mapping techniques for soil fertility management at regional and farm levels in Switzerland, teaching rangeland conservation concepts in Kazakhstan, and serving on multi-year residential assignments to support capacity building efforts in the Federated States of Micronesia and Republic of Palau.

IPD also facilitated 18 foreign delegation visits that enabled NRCS technical experts and senior executives to meet and engage with 199 foreign visitors from 50 countries—government officials, scientists, and academics—at headquarters and field locations. Aside from bilateral meetings with Canada to strengthen regional cooperation, the majority of requests were for presentations to increase institutional knowledge and exchange scientific information. NRCS staff conducted briefings or led discussions on specific topics. Examples include delegations from Burma (overview of NRCS and Natural Resources Inventory), India (overview of NRCS and conservation delivery system), Japan (Farm Bill Conservation Programs and implementation), Pakistan (soil quality and water conservation challenges), and Tunisia (integrated pest management). Among the requests were also opportunities to conduct presentations for two multinational delegations, visiting fellows with U.S. Soybean Export Council, and candidates from the U.S. Department of State International Visitor Leadership Program (IVLP).
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Acronyms and Initialisms

ASSIST  Applying Science to Strengthen and Improve Systems
CBCS  Brazilian Soil Science Congress
CIAT  International Center for Tropical Agriculture
CNMI  Commonwealth of the Northern Mariana Islands
FAS  Foreign Agricultural Service
FEMA  Federal Emergency Management Agency
FY  Fiscal Year
ICARDA  International Center for Agriculture in Dry Areas
IPD  International Programs Division
LiDAR  Light Detection and Ranging
NASA  National Aeronautics and Space Administration
NABEC  Northeast Agricultural and Biological Engineering Conference
NGO  Nongovernmental Organization
NOAA  National Oceanic and Atmospheric Administration
NRCS  Natural Resources Conservation Service
RUSLE3  Revised Universal Soil Loss Equation 3
USCRTF  U.S. Coral Reef Task Force
USDA  U.S. Department of Agriculture
IVLP  International Visitor Leadership Program
USAID  U.S. Agency for International Development
Introduction

NRCS has had an international presence and involvement since the 1930s. NRCS is involved in a full range of activities that help foreign governments develop, use, and protect their natural resources, contributing to U.S. foreign policy by promoting economic stability, reducing poverty, and solving world food problems. Furthermore, U.S. domestic agriculture and the agency benefit from gaining access to new technologies, learning best practices, and developing contacts with global stakeholders. NRCS staff regularly participate in international meetings, present findings at conferences, support scientific and technical exchanges, engage in post-disaster recovery assistance, and provide short-term and long-term technical assistance.

Some of the activities of IPD over previous years included facilitating the following: deployment of more than 65 agricultural advisors to serve for up to 18 months on Provincial Reconstruction Teams in Afghanistan and Iraq; presentation of papers and posters at the 21st World Congress of Soil Science in Rio De Janeiro, Brazil; and participation in long-term research collaboration to study frozen desert soils in Antarctica.

Additionally, agency experts regularly seek out volunteer assignments offered through nongovernmental organizations. These activities are not captured in the IPD Annual Report but do provide agency staff with additional opportunities to participate in international development projects and gain new experiences.

Demonstration of tools used to measure results of regenerative agricultural practices for soil health at a Canadian workshop.
Selected Country Activity Reports

Brazil

37th Brazilian Congress of Soil Science Conference

At the invitation of the Brazilian Soil Science Society, the NRCS associate director for soils information in the Soil and Plant Sciences Division traveled to Cuiabá, Brazil, to attend the 37th Brazilian Congress of Soil Science. The conference brought together nearly 1,000 individuals, including soil scientists, agronomists, and agriculture professionals from throughout Brazil. The theme of the conference was “Sustainable Intensification of Production Systems.” Attendees represented a broad cross-section of stakeholder groups, including government entities and agencies, nongovernmental organizations, universities, and the private sector. The conference included oral- and poster-presentations on a wide range of topics, including soil taxonomy, soil fertility, soil biology, education, and outreach. The associate director presented one of four invited plenary addresses. His presentation was titled “Benefits of the Soil Survey for Farmers and the Society: The USA Case.” He also participated in formal and informal discussions in the context of the conference and attended two field tours. The tours highlighted the diversity of soil resources in Mato Grosso Province and some of the innovative management strategies being used to sustainably manage those resources.

Conference participants were overwhelmingly from Brazil and represented a wide variety of institutions and organizations. A small number of foreign specialists also participated.

Although the specifics of soils and climate differ from much of the United States, Brazilian agriculture faces many of the same challenges faced by U.S. agriculture to maintain productivity in a sustainable manner. Participation in the conference made clear the ample opportunities for current and future collaboration with our Brazilian counterparts. Such collaboration has the potential to benefit both countries.

The primary immediate benefit of NRCS participation at the conference and related activities was to provide active and visible support to our colleagues as they work to improve the science behind sustainable intensification of agriculture. Recent news stories have again highlighted the need for increased agriculture resilience in the face of extreme climate events. Also highlighted has been the need to reduce the
conversion of forest ecosystems to agricultural use and thereby retain the valuable ecosystem services they provide. The best practices being developed and implemented in Brazil may be directly applicable to similar circumstances in selected parts of the United States. The principles underlying those practices may have wide application to U.S. agriculture.

In addition to sustainability, Brazil faces challenges similar to those of the United States related to the collection, curation, and dissemination of the soils information used to inform land management. As an example, many Brazilian farmers are expanding the use of precision agriculture technologies. This expansion is particularly true for the large-scale production of commodity crops in a fashion similar to that used by U.S. farmers. Better understanding of ongoing Brazilian efforts in the area of digital soil mapping and better sharing of best practices will speed the development of the soils information needed to underpin the agriculture of the future. Although connections can be made remotely, there is no substitute for face-to-face discussions to help identify common goals and challenges that can lead to specific collaborative activities.
Canada

Digging Deep into Regen Ag Workshop

By invitation, an NRCS soil health specialist presented at the “Digging Deep into Regen Ag Workshop” in Alberta, Canada. The specialist’s topic was soil health. He was one of three speakers at workshop, which was held March 14, 2019, at the Mans Organics farm, near Coaldale, Alberta, Canada. Hosted by Alberta Man, the 1-day, annual event attracted more than 80 farmers. Each speaker presented and participated in the greenhouse tours. During the workshop, the NRCS soil health specialist provided soil demonstrations.

The benefits of NRCS participation in the workshop included the exchange of information regarding the integration of cover crops and livestock into cropping systems and the use of cover crops in gardening and greenhouses. Monitoring the soil food web and carbon impacts were two of the more important components that were shared. Information gained will be shared with NRCS clients in North Dakota and others.

NRCS soil health specialist exchanging information with conference participant about cover crops and the impact on crop residue levels in soil.
Northeast Agricultural and Biological Engineering Conference

Two engineers from NRCS attended the Northeast Agricultural and Biological Engineering Conference (NABEC) in Quebec City, Canada, from June 16 to 20, 2019. The NRCS civil engineer gave a presentations on “Bedded Pack Facilities” and proper “Parliamentary Procedure.” The State conservation engineer made presentations on the status of “China Lake Alewife Restoration Initiative” and “My Continued Career in Utilizing Science and Engineering Principles in Sports Talk Radio.” The conference provided an opportunity to network and exchange thoughts and ideas with many other engineers from academia, government, and the private sector across the northeastern United States and eastern Canada. The conference hosted nearly 80 participants, including several current and retired NRCS engineers. There were 12 different universities represented at the conference. Discussions involved thoughts and ideas that can be implemented into the everyday work of engineers and agencies. During the first two days, the State conservation engineer served as a judge for a graduate-student paper competition consisting of 10 minute “technical short” presentations. The third day was a technical tour.

Columbia
Cacao for Peace Project

The USDA–NRCS Soil and Plant Science Division, Penn State University, and the International Center for Tropical Agriculture (CIAT) have been collaborating for almost a year on the “Cacao for Peace Project” in Colombia. The project is designed to promote cacao as a high-value alternative to coca. Researchers are
investigating the suitability of the area for producing high-quality flavor cacao. The crop would be grown for local consumption and for export.

Many challenges need to be addressed to intensify and expand cacao production in the region. Optimum cacao production occurs only in a narrow range of tropical temperatures and requires moderate to high rainfall and well-drained soils. Another challenge is a growing concern over high cadmium levels in cacao beans. New European Union regulations for cadmium levels in chocolate have resulted in part of the project being focused on the evaluation of cadmium levels in the soil, foliar, and cacao beans.

A multidisciplinary team of soil scientists and plant geneticists from the collaborating institutions have been investigating limitations to profitable cacao operations in the Santa Marta region of Colombia. Soil scientists are seeking to produce more detailed soil maps that delineate the different soil types and to identify the soil’s suitability and limitations for cacao production at the small-farm scale (1–3 hectares). The specific objectives are to map regional soil characteristics, soil moisture regimes, and cacao genetics. These investigations will result in a deeper understanding of the spatial and vertical distribution of cadmium in these soils. They will also identify the typical soil characteristics (pH, texture, moisture regime, and temperature regime) needed to develop cacao suitability maps for the pilot area. Cadmium levels in soils will be compared to cadmium accumulation in the beans of the diverse cacao varieties cultivated in the region.

The project will also involve mapping the genetic diversity of cacao varieties in the project area. This mapping will help in the identification of high-yielding, drought-tolerant, and disease-resistant varieties and possibly of cadmium excluders.

In fiscal year 2019, the scientists continued their sampling activities at the Buritaca and Guardabosques farms. At times, the teams used donkeys or horses to transport equipment to remote sites. The completion of the field sampling campaign was a welcomed milestone. The samples were packed in
trucks and taken to CIAT Colombia, and the U.S. team members packed their bags for their journey home.

The team held collaborative deliberations at CIAT, Colombia. The team focused on the following components to complete the Cacao for Peace project: soil-test results, quality assurance and quality control for test data, development of cacao suitability maps, soil cadmium evaluation, GIS platform development, planning for LiDAR data acquisition, training on soil erosion modeling using RUSLE3, and digital soil mapping training for Colombian scientists using Colombia-specific crop management scenarios. The training will take place at CIAT, Colombia.

Netherlands

Wageningen Soil Conference 2019

On August 31, 2019, the NRCS national resource soil scientist traveled to Wageningen, Netherlands, to attend the Wageningen Soil Conference 2019.

Prior to the conference, the NRCS scientist visited Agrocares. This private company operates a laboratory that supports spectral predictions of soil properties. Agrocares’ current work with a U.S. cooperator was discussed. The NRCS scientist gave a talk about NRCS, the U.S. Soil Survey, and how we have begun to evaluate spectral predictions of soil properties.

The 4-day Wageningen Soil Conference 2019 focused on soil function. Keynote topics included soil organic matter and land use change. General sessions were held regarding broad, large-impact studies. Parallel session talks were held on more specific soil function issues. Master classes were held in which participants engaged in topics more deeply.

The NRCS scientist presented a general session talk on the Science of Soil Health Project and our intentions for measuring and mapping soil health related soil properties. The feedback from the talk was good. The talk was an opportunity to learn about similar international projects, such as Landmark, and to make contacts for further discussion.

The NRCS scientist attended master classes on a decision-support tool named “Dexi.” This tool could assist with teaching and communications. In particular, it could be useful during the development of soil survey interpretations and during discussions regarding the use of spectral data for soil management. The tool has the potential to help frame how we conceptualize our use of similar technologies.

The conference had many participants of diverse origins, including from Europe, the U.S. Geologic Survey, and The Nature Conservancy. The conference alerted us to several relevant tools and papers and provided key contacts for follow-up.
Palau

The U.S. Coral Reef Task Force (USCRTF) was established in 1998 to lead U.S. efforts to preserve and protect coral reef ecosystems. USDA has been a member of the Task Force since its inception. The 42nd meeting of the Task Force was held at the Palau International Coral Reef Center in Koror, Palau, from September 8–23, 2019. The official business meeting was held at the Ngarachamayong Cultural Center in Koror.

The USDA’s principal representative on the Task Force is the NRCS national water quality specialist and aquatic ecologist. The representative, who was invited by Palau President Tommy Remengesau to attend, is a member of the steering committee and co-chair of the watershed working group. The representative participated in a variety of workshops and site visits on topics including watersheds and land use, fisheries, Palau’s Protected Areas Network, Palau’s National Marine Sanctuary, and Palau’s National Aquaculture Center.

Topics discussed at the meetings included:

- Task Force working group updates
- Coral Reef Conservation Act reauthorization
- All Islands Committee requests, including support of Coral Management Fellows and restoration support
- Ballast water update (as potential mechanism for spread of Stony Coral Tissue Loss Disease)
- American Samoa’s priority watershed graduation process, including American Samoa Environmental Protection Agency’s role and responsibility with long-term monitoring
- Evaluating the impacts of land cover and water on coral reef resources
- Watershed project updates from American Samoa, West Maui, Guam, and Commonwealth of Northern Mariana Islands
- Role of the Freely Associated States in the Task Force
- How best to utilize Federal Emergency Management Agency as a new Task Force member

There were also multiple scientific presentations on topics such as:

- Caribbean Stony Coral Tissue Loss Disease
- National Aeronautics and Space Administration NeMo-Net education app for coral reef benthic characterization
Key participants in the meeting included federal agency principal representatives, steering committee members, guest speakers, and other Palauan partners in coral conservation.

The benefits of USDA participating in the U.S. Coral Reef Task Force meetings are significant. Coral reefs provide habitat and shelter for many marine organisms, protect coastlines from the damaging effects of wave action and tropical storms, assist in carbon and nitrogen fixing, and help with nutrient recycling. USDA plays a critical role in protecting coral reefs by helping agricultural producers limit sediment and nutrient loads from land-based agriculture.

The annual jurisdictional Task Force meeting allows the 12 participating Federal agencies (including USDA), seven U.S. States, territories, and commonwealths and three Freely Associated States to share the latest research on coral protection, disease response, and opportunities to collaborate. The annual meeting also allows the host jurisdiction an opportunity to discuss coral reef achievements and further challenges that need to be addressed.

The following action items resulted from the USCRTF meeting:

- At the request of Admiral Gallaudet of the National Oceanic and Atmospheric Administration (NOAA), NRCS will prepare a letter requesting Undersecretary Northey’s participation in the U.S. Coral Reef Task Force as the principal member for USDA.
- As co-leader of the USCRTF Watershed Working Group, the NRCS national water quality specialist and aquatic ecologist will continue working with priority watershed staff to facilitate programs that can help address land-based sediment and nutrient pollution affecting coral reefs.
• NRCS will collaborate with the National Fish and Wildlife Foundation to support funding through the coral reef partnership initiative.
• NRCS and NOAA will explore options for an NGO to host a data management platform that helps manage data streams from various entities working in priority watershed sites.

Pakistan

A team from USDA–NRCS traveled to Pakistan to provide a 3-day workshop in the Gomal Zam Dam area.

Agriculture is a major sector of Pakistan's economy. Water is a limiting factor to both economic development and food security in Pakistan. Rapid population increases, infrastructure issues, and climate fluctuations and changes have resulted in the use and availability of water becoming a critical issue. Proper watershed planning is needed to ensure that watershed conservation, rehabilitation, and use are appropriately coordinated and implemented. Implementation of practices or techniques without proper planning can be ineffective or even destructive to the economy and the environment.

The workshop focused on the use of area-wide planning in the surrounding watershed; reducing sedimentation in the barrage-and-canal water delivery system; addressing watershed treatment needs; and increasing on-farm irrigation efficiency in the command area. The workshop was titled “Watershed Planning for Soil and Water Conservation.” The basis for the workshop was the 9-step planning process used by USDA–NRCS to plan soil and water conservation techniques and practices in the United States.
In addition to providing the workshop, the team:

- Met with officials from the International Center for Agriculture in Dry Areas (ICARDA) to plan for future soil and water conservation efforts, including the use of agricultural service providers to assist farmers in implementing new soil and water conservation technologies.
- Met with USAID Pakistan, State Department Economic Office, ASSIST, and FAS to discuss projects and future work in Pakistan. The discussions focused on current and future programming needs, primarily soil and water conservation measures and watershed planning and implementation.
- Was featured on the radio show “Tea Time with the U.S.,” where they were interviewed on the topic of watershed planning. The show is on the radio channel “Power 99,” which is heard around most of Pakistan.

This trip was part of a sequence of temporary duty trips to provide ongoing support of multiple objectives for two ongoing projects: the U.S.-Pakistan Soil Health and Fertility Project and the U.S.-Pakistan Water Dialogue. The USDA team is facilitating Pakistani-led efforts on these projects. The implementing partner for both projects is the International Center for Agricultural Research in the Dry Areas (ICARDA).

**The U.S.-Pakistan Soil Health and Fertility Project.** This project is also referred to as “Improving Soil Health and Fertility through Extension.” The project was initiated in 2013. It focuses on building capacity in the public sector and mobilizing the private sector to improve soil fertility through improving soil health and promoting the “4Rs” of nutrient management. The 4Rs are right nutrient in the right amount at the right time with the right placement.

**The U.S.-Pakistan Water Dialogue: Diffusion and adoption through partnerships and action of the best watershed rehabilitation and irrigation practices and technologies to help rural farmers.** This project was initiated in 2016. This project is a continuation of three projects:

- U.S.-Afghanistan-Pakistan Trilateral Initiative’s Watershed Rehabilitation and Irrigation Technologies Work Group.
- Watershed Rehabilitation and Irrigation Improvement in Pakistan: Demonstrating and Disseminating the Best Practices and Technologies to Help Rural Farmers.
- Pakistan Strategic Water Dialogue Project and Pakistan Watershed and Irrigation Demonstration and Dissemination Project.

The primary goal of this project is to promote further adoption of technologies that were identified and demonstrated during the previous studies. Because this project continues with many of the participants and specific efforts initiated in the Watershed Rehabilitation and Irrigation project, this project is also referred to as the Water Dialog—Phase 2 project. In addition, because the mantra for this project has been aptly articulated by Dr. Majid of ICARDA as “Impact thru Adoption,” the project is also referred as the Water Dialogue: Diffusion and Adoption project.
By the Numbers

International Travel
NRCS employees participated in 24 international travel assignments in FY–2019, taking them to 14 different countries. The most trips were to Canada (4) and Columbia (4), followed by Netherlands (2), Pakistan (2), and South Africa (2). Two employees completed multiyear residential-assignment posts in the Federated States of Micronesia and Republic of Palau.

These 24 assignments primarily provided NRCS employees the opportunity to engage in the exchange of scientific information. The employees participated in 16 conferences. Temporary duty by 4 NRCS employees was provided to build capacity, technical assistance, and training in digital soil mapping at resolutions suitable for management at the farm level. One employee conducted workshops on Rangeland Conservation Planning, application, and monitoring for sustained productivity and land integrity. Participation in one exchange program provided an employee opportunity to learn more about the policies, innovations, and on-farm management practices occurring to address the impacts of a changing climate and solutions implemented during a recent drought.

Foreign Visitors
In FY–2019, IPD supported 18 requests for NRCS employees to meet with 199 foreign visitors. These engagements were primarily for presentations and sharing of scientific and technical information as part of speaker requests or in support of specific programs.

The agency maintains an outstanding international reputation and is continually sought out by foreign officials for guidance and information. Requests for presentations and scientific cooperation were submitted on behalf of 50 foreign countries, with the majority of visitors coming from China (37), Ecuador (13), Japan (13), and North Korea (13). NRCS subject matter experts also supported presentation requests for multinational delegations, thereby assisting IVLP and the U.S. Soybean Export Commission.

NRCS Employee Participation
In total, 20 employees traveled to support the 24 international travel assignments. Four of the employees traveled for NRCS for the first time. In FY–2019, 19 employees traveled once, one employee travel two times, and one employee traveled four times.

The 18 foreign visits were supported by 17 NRCS employees throughout the United States. These visits were for presentations or were otherwise educational in nature. This allowed technical experts to serve as the presenter and reach 98 foreign visitors. The remaining visits had multiple NRCS speakers. A total of 199 foreign visitors were reached.
Division Operations

Program Management
Throughout FY–2019, IPD evaluated policies and procedures to improve the overall efficiency and management of the agency’s international activities. This included ongoing coordination to synchronize operations with FAS, other sister agencies of USDA, and interagency partners. Additionally, IPD provided agency staff with new or updated guidance to further increase awareness about international activities.

International Travel Program
IPD’s International Travel Program provided support functions that enabled agency employees to conduct official U.S. Government business in foreign countries. This support included obtaining official passports and visas to undertake travel, requesting country clearances from U.S. embassies, and providing guidance on additional topics, such as traveling with electronic devices, medical evacuation policy, mandatory security training, and inoculations.

Communication Products
Five national bulletins were prepared and released in FY–2019:

- International Assignment Candidates Database (NB 280-19-2)
- Meeting with Foreign Visitors (NB 280-19-3)
- Updated Information on International Travel Procedures (NB 280-19-6)
- Departmental Procedures for Engagement with Cuba (NB 280-19-7)
- International Programs Division FY-2018 Annual Report (NB-280-19-8)

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Front Cover

*Upper left:* Demonstration of tools used to measure results of regenerative agriculture practices for soil health at a workshop on regenerative agriculture in Alberta, Canada.

*Upper right:* An integrated silvo-pastoral system consisting of beef cattle and teak in the Pantanal region of Mato Grosso Province in Brazil.

Center right: Cacao farm in Columbia.

*Lower:* Attendees of the Northeast Agricultural and Biological Engineering Conference in Quebec City, Canada.

Back Cover

*Upper left:* Attendees at a watershed workshop in Pakistan.

*Upper right:* Transport for equipment and supplies over rough and steep terrain in Columbia.

*Lower:* Boat dock at the Palau International Coral Reef Center.
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