Soil Survey Horizons

Sampling, Educating in Afghanistan

Winter 2009 | Volume 50, Number 4 | Pages 109–136

USDA-NRCS Soil Scientists in Afghanistan

Bruce Dubee, Jason Nemecek, and Ed Tallyn

As part of USDA's effort to support the Afghanistan military campaign, Operation Enduring Freedom, the Natural Resources Conservation Service–National Soil Survey Laboratory (NRCS-NSSL), working in partnership with the USDA Foreign Agricultural Service (FAS) developed an agreement to sample soils; teach local nationals about soil and water conservation, soil sampling, and techniques for describing a soil; and also promote capacity building of the agricultural sector in Afghanistan. This article will relate the experience from the point of view of the senior author, Bruce Dubee, as an agricultural advisor and the experience of sampling soils in Afghanistan.

Afghanistan? Why during a war? The answer is complicated, just like everything else in Afghanistan.

Most Americans don't realize it, but winning the war on terrorism in Afghanistan is much more than fighting with guns and bombs. Security operations may dominate the news from Afghanistan, but I believe the fighting includes another very different war, a battle against ignorance and poverty, in a very dangerous region, under conditions that most of us would consider shocking. Winning

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Published in Soil Surv. Horiz. 50:116–119 (2009).

Soil Sampling Team: (left to right) Tony Beals, Bruce Dubee, Jason Nemecek, Ed Tallyn.

Bruce Dubee (left) and Jason Nemecek (right) along with local children observing.

Typical Landscape in Kunar Province.

Clockwise from top left:

Flood irrigated wheat field with soldiers' protection in Kunar Provence near Korengal Valley (i.e., Valley of Death).

Typical Landscape (mountain and river valley) in Kunar Province.

This soil was sampled in the Marawara District in Kunar Province. It's located on a fan apron and is classified as a Fine-loamy, mixed, superactive, thermic Aridic Calcixerolls. The National Soil Survey Center pedon id is S09AF015003

Local Afghan girls in Kunar Province.

Jason Nemecek (bottom), (left to right) Bruce Dubee, Tony Beals, and Ed Tallyn talking with members of the Afghanistan Department of Agriculture. The members observed the soil sampling process and received hands-on training on how to take soil samples.

this war so that our brave soldiers and sailors can come home will not only necessitate victory on the battlefield, but victories in developing the government, health, education, business, and agriculture sectors. With nearly 75% of the people of Afghanistan directly employed in agriculture, promoting the development of the agriculture sector is crucial to creating opportunity and hope for the people of Afghanistan.

Like most of Afghanistan, Kunar Province is a rugged mountainous area. It is located in the northeastern part of the country and on the border with Pakistan. Besides the ongoing conflict, it is prone to a variety of natural disasters, including earthquakes, floods, droughts, landslides, and avalanches. The region is desperately poor and is unable to produce enough food to meet the needs of its population.

The security situation in Kunar Province has been and will probably continue to be very dynamic for the near future. While we were able to get out to all the districts in the province, insurgent activity did significantly increase during my deployment. This escalation in activities affected the when, where, and how of how we did business, but generally did not stop overall progress in providing technical assistance for the reconstruction of Afghanistan's agricultural sector.

Arriving at the Provincial Reconstruction Team (PRT) in Kunar as the first USDA Advisor was a very memorable experience. I recall thinking, "How am I ever going to get done what needs to be done? Twenty-five years of war, uncontrolled timber harvesting, overgrazing, destroyed infrastructure, no extension service, language and cultural barriers, etc.…What did I get myself into?"

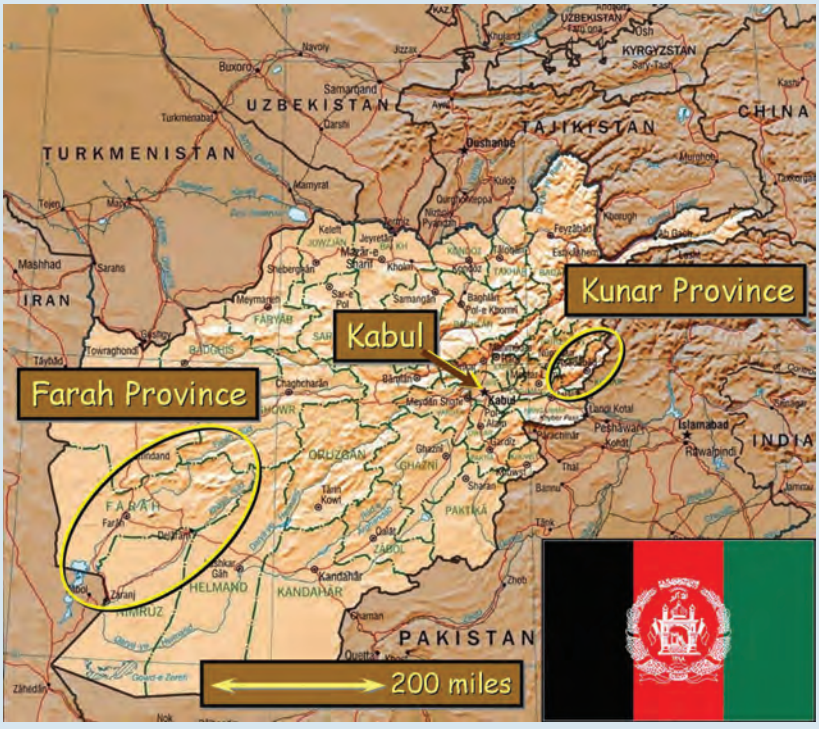
With all this in mind, we (the PRT) decided to do some soil sampling. Why sample soils? From everything that we could figure out, crop yields were incredibly low for irrigated croplands. Several of my USDA colleagues in neighboring provinces and I estimated that wheat yields were in the neighborhood of 30 to 35 bushels per acre. A very limited amount of arable land (about 5% of the Province) and a production level barely able to allow residents to feed their families made this is an issue that needed to be addressed. Thinking that this problem was related to soil fertility, seed quality, and poor management, we decided to tackle the soil fertility issue. With no functioning laboratory facility, sampling equipment, or soils data, we requested assistance from the NSSL.

We proposed that the NSSL provide short-term assistance for describing, classifying, collecting, securing, shipping, and analyzing samples. Two NSSL support personnel in conjunction with Anthony Beals, USDA Advisor in Farah Province (NRCS Area Agronomist, UT), and I were to provide the field and technical expertise while in Afghanistan. The NSSL agreed to perform physical and chemical analysis for each pedon sampled. Fifteen pedons total were to be sampled, five pedons each from Farah, Kunar, and Nangahar Provinces. To facilitate cross-cultural exchange and capacity building, a site visit to the Sesheem Bagh soils laboratory in Nangahar by the team was included in the proposal.

After many lengthy phone conversations, Ed Tallyn, USDA-NRCS Soil Scientist, Soil Data Quality Specialist, Davis, CA, and Jason Nemecek, USDA-NRCS Soil Scientist, Santa Fe, NM, volunteered to provide field assistance for this project. Their assistance was instrumental to the success of this project.

During our conversations, we very frankly described what living conditions were like—"this is a war zone, you may be shot at, you could be killed or wounded. Suicide bombers, mines, and IEDs are always a potential threat, and living conditions are spartan. Working while wearing 40 pounds of body armor and a helmet, surrounded by soldiers and armored vehicles, is not easy and is not your typical soil sampling experience. The work is personally and professionally, rewarding and every day will be like *National*

Ed Tallyn (left) and Jason Nemecek (right) in soils pit with Bruce Dubee (left) and Tony Beals (right) talking with members of the Afghanistan Department of Agriculture, including director of Aslam Dana. The members observed the soil sampling process and received hands-on training on how to take soil samples.



Map of Afghanistan showing general area of soil sampling.

Geographic Adventure. You will need to be very flexible! Do you still want to come?" "Yes, I'll do it" was the answer from each of them.

Therefore, in January of 2009, Ed, Jason, and I began our sojourn to Afghanistan. We met in Atlanta, boarded our flight, and headed off. Five days later we were in Kunar Province about 5 miles from the Pakistan border. While not unexpected, almost from the start the scope of work changed. Afghanistan being Afghanistan forced us to continually modify our plan. If there is one thing you learn while working in Afghanistan it is that things are very "dynamic." While we never made it to Nangahar, the rest of the trip worked out without too many complications.

We spent about a week on the ground in both Kunar and Farah Provinces, traveling by helicopter and small airplanes back to Kabul between visits to the provinces. When we were on the ground, we always traveled in convoy. We ate, slept, and worked with the soldiers and sailors on a military base that had a PRT assigned to it. I can't say enough about how well we were treated, considering where we were and all the extra work the soldiers had to do to accommodate equipment, our soil samples, and us. It was an amazing feeling to be part of this team.

Watching the looks on Jason and Ed's faces during our first security briefing before our first mission was truly memorable. I could see their faces getting serious and their eyes getting wider and wider as more and more information became known. Were they nervous? You bet, just like everyone else in the room, only this was their first time leaving the base. After the briefing, just like our brave soldiers who risk their lives daily, Ed and Jason put on their gear and "saddled up" for one incredible sampling trip. Going to work in an up-armored Humvee or MRAP (Mine Resistant Armored Personnel Carrier) is not like riding around in a pickup truck.

We drew a crowd everywhere we went, which in Afghanistan is usually a good thing. When the villagers aren't around, you really need to pay attention. When people realized what we were doing, they were thrilled. They would carry our equipment out to the field and surrounded us while we did our work. At every stop, we met villagers, students, and government officials. Most importantly, local agricultural extension agents either observed or participated in the sampling. We kept hearing the same thing repeatedly, "We've read about this in books, but have never had any practical or field training. Come back and help us."

While we didn't get everything done we set out to do, we did get to describe and sample fourteen pedons. Our outreach and capacity-building efforts were an overwhelming success, as evident by numerous invitations to come back.

Preliminary field findings suggest that the soils have good agricultural potential and that moving beyond bare subsistence farming will require the implementation of robust irrigation and crop management training programs. Furthermore, laboratory results from this study will be interpreted and summarized to provide information that will help rural farmers improve yields and increase incomes.

This collaborative effort between the NSSL and FAS was not without many significant risks. My thanks go out to Jason Nemecek and Ed Tallyn for their bravery and unwavering support throughout the entire trip. As I recall, when asked why they wanted to do this, they pretty much responded by saying that they wanted to study soils in a foreign land, better understand the issues of Afghanistan, and had a desire to help people. I think they did that and a lot more. I'm quite sure they'll agree that this was more like the TV show, *Band of Brothers* or a *National Geographic Adventure* experience than a soil sampling trip.

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

Students from Farah's Agriculture High School look to learn about soil properties.

Typical Farah landscape. Citadel in the background was built by Alexander the Great around 325 BCE.