

Getting Occupational Student Training in Agricultural Research Through Novel Workshops (Go START NOW)

Shad D. Nelson, Dean

Dick & Mary Lewis Kleberg

College of Agriculture & Natural Resources



GO START NOW

USDA-NIFA HSI grant
award # 2021-77040-34868

Randy Stanko (P.D.) TAMUK

C. Donato, T. Machado, S. Chumbley, G. Schuster
S. Nelson (TAMUK, Co-PDs)

K. Jayachandran, M. Bhat (FIU, Co-PDs)

D. Sotomayor, G. Martinez (UPR-Mayaguez, Co-PDs)



Identify the Opportunities:

2001: my experience as an Asst. Professor

Students ready for research and that would consider graduate school

Addressing Hispanic Students and Parents resistance to relocate

Students willing to take jobs with USDA

Expanding the Vision to Impact more Hispanic Students located in southern regions of U.S.A.

Outline:

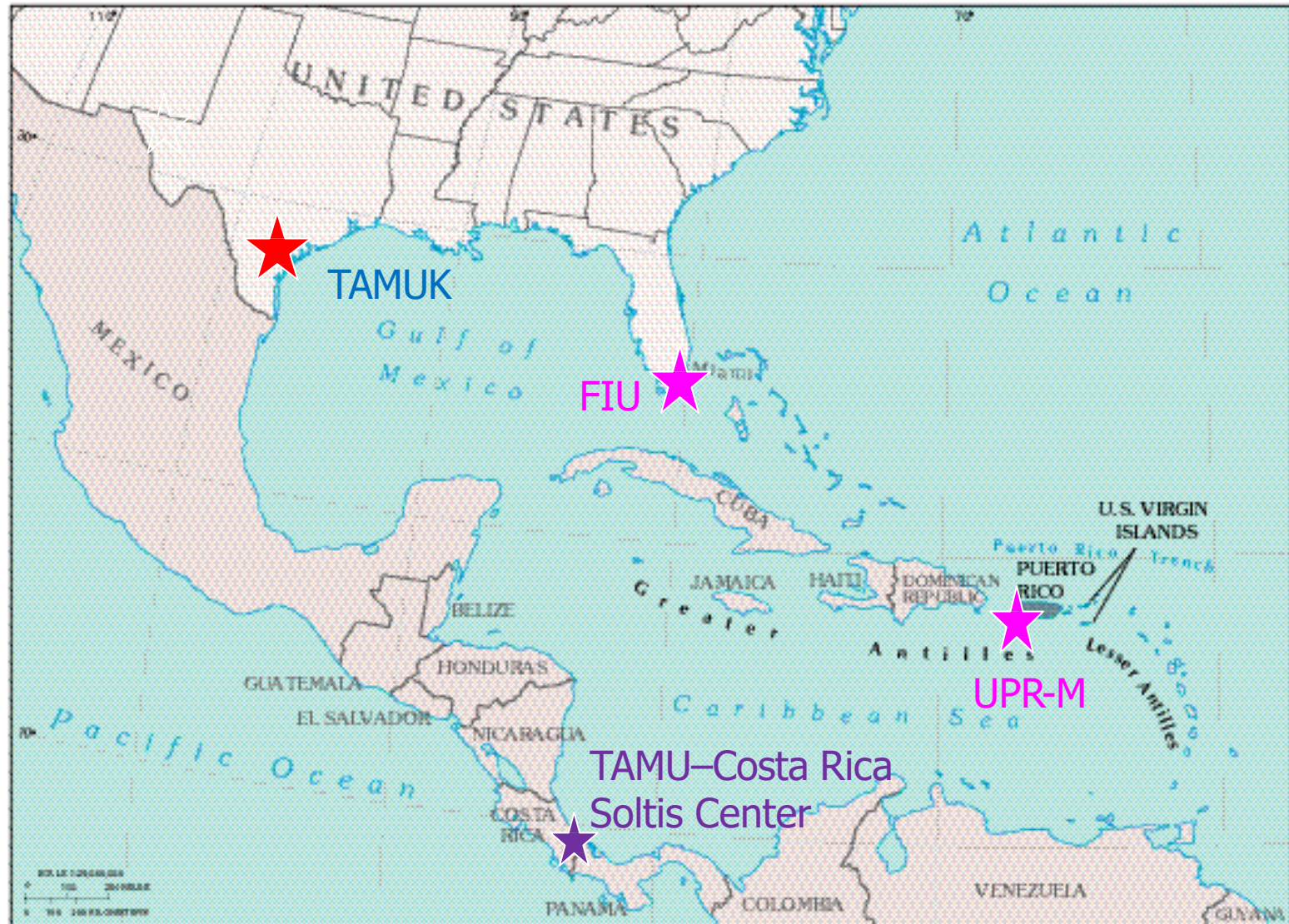
Example of a successful model for multi-state collaboration among Hispanic Serving Institutions

The Impact of a Collaborative HSI network on increasing student participants in USDA careers and graduate school

Discussion about how TAMUK has been successful in USDA-NIFA HSI funding support

2021-2025: GO START NOW program

Multi - HSI Collaborative Partnership



Major Project Objectives

Project Goal:

To empower underrepresented students through research training in the animal, plant, soil and natural resource sciences to encourage Hispanics to enter careers in USDA-NIFA Priority Science Areas.

Activities:

- 1: Research-based experiential learning with faculty
- 2: Professional Internships with USDA agencies
- 3: Multi-HSI-Institutional Career Preparation through international workshops

Audience served

The project serves an underserved Hispanic student population that is underrepresented in USDA careers within the US.

Hispanic student body population demographics:

69% Texas A&M University-Kingsville

67% Florida International University

91% University of Puerto Rico-Mayaguez

Partnerships with USDA Agencies for Summer Internships Across the U.S.A.

■ -NRCS



■ -ARS



■ -APHIS



■ -AMS



■ -FS



Undergraduate Research Internships



USDA-APHIS-VS Laredo, TX



USDA-ARS, Beltsville, MD



USDA-AMS, Washington, DC



USDA-NRCS, Texas

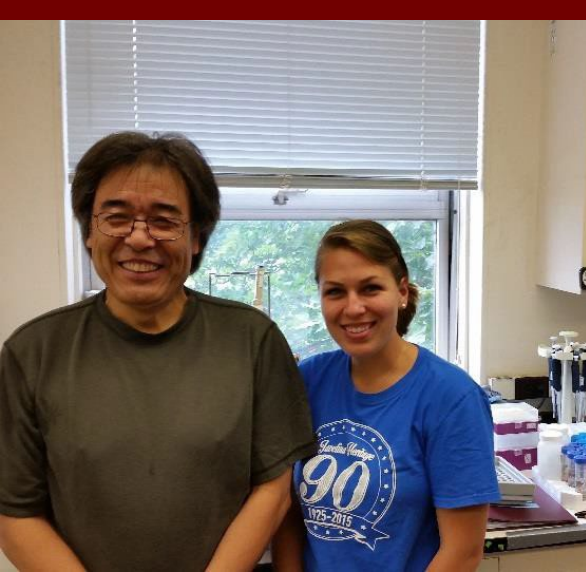


USDA-APHIS-Wildlife Services, Fort Collins, CO



USDA-ARS-MARC, NE

Washington DC summer internships and Professional Development Skills



22

Effect of dietary sulfur on *in vitro* true digestibility in dorper wethers

Virginia Garza^{1*}, K. C. Mcquist¹, G. Paz², C. L. Lara¹, J. J. Martinez¹, L. P. Sastre¹, N. L. Bell¹
Texas A&M University-Kingsville, Kingsville Texas

Introduction

- Sulfur has the potential to increase wool growth and influence lamb survival. However, the addition of sulfur may have unforeseen effects on feed digestibility.
- The *in vitro* digestibility technique is used to estimate digestibility of feedstuffs in a more economic manner than traditional *in vivo* methods.

Materials and Methods

- High concentrate (90%), low roughage (10%) growing rations were assigned to each treatment: CON (0% of DMI as dietary S) or SUL (0.1% of DMI as dietary S).
- Diets were ground and analyzed for dry matter content and sulfur.
- Rumen fluid from sheep fed sulfur had no effect ($P = 0.81$) on its ability to digest the two feedstuffs (CON and SUL).
- In vitro* true digestibility.
- Incubation of samples in rumen fluid collected.

Objectives

- Evaluate effect of dietary sulfur on digestibility of feedstuffs.
- Evaluate ability of rumen fluid from animals consuming dietary sulfur to digest feedstuffs (compared to control).

Results

Figure 2. *IVTDm* of Rumen Fluid

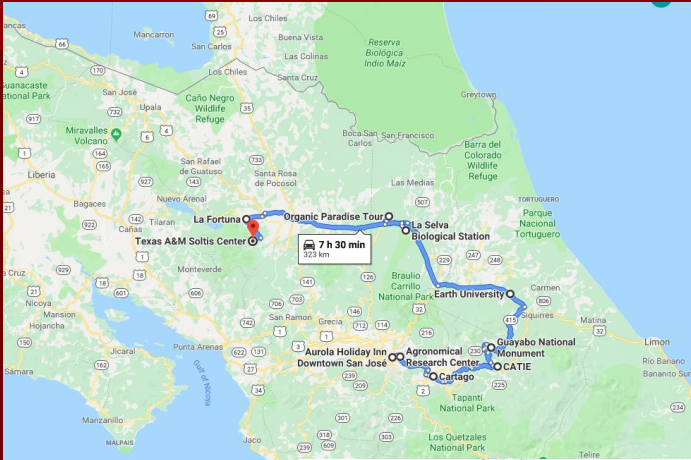
Treatment	IVTDm
Control	~0.15
Sulfur	~0.15

Conclusion

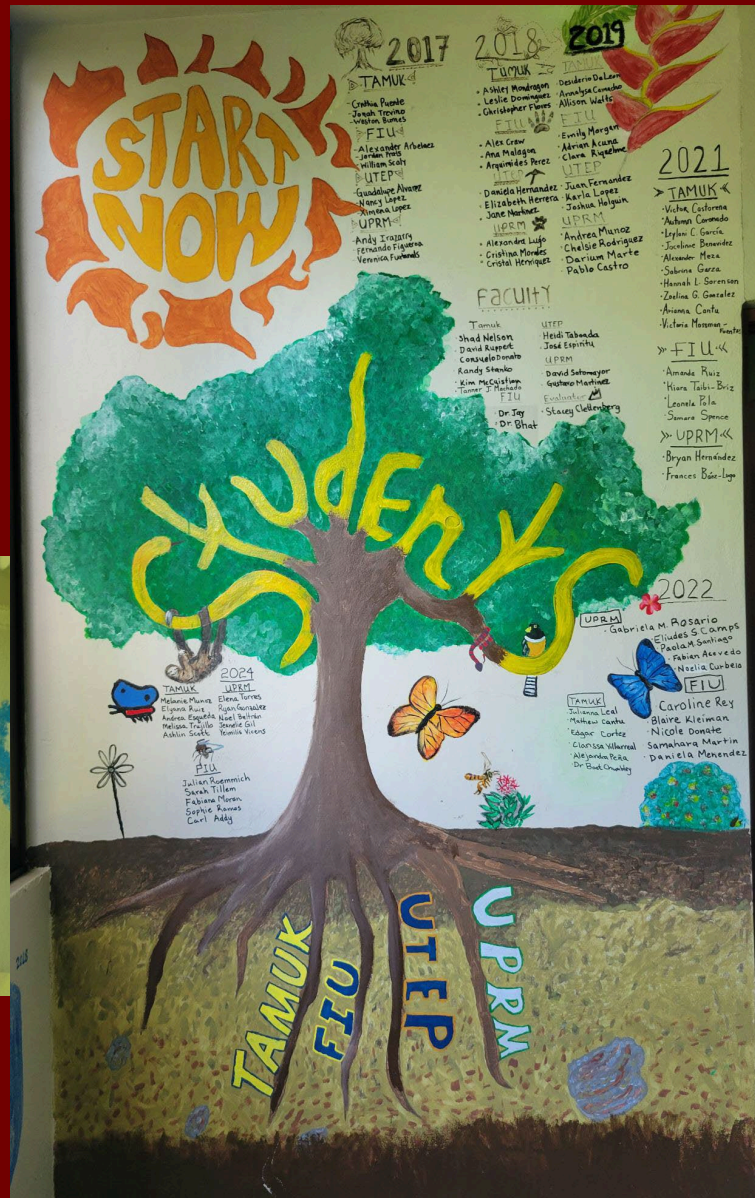
- Sulfur present in the feedstuff had no effect ($P = 0.16$) on *in vitro* true digestibility when digested in rumen fluid from CON or SUL wethers.
- Rumen fluid from sheep fed sulfur had no effect ($P = 0.81$) on its ability to digest the two feedstuffs (CON and SUL).
- In conclusion, sulfur would not be utilized to improve digestibility in livestock, but can be used in other methods relative to production.
- Further analysis of microbial populations in each of the two treatments will be completed in the future.



International Workshops: Costa Rica



TAMU Soltis Center: Costa Rica Workshops



Initial Workshops: Student Presentations



Faculty Educational Training Workshops:

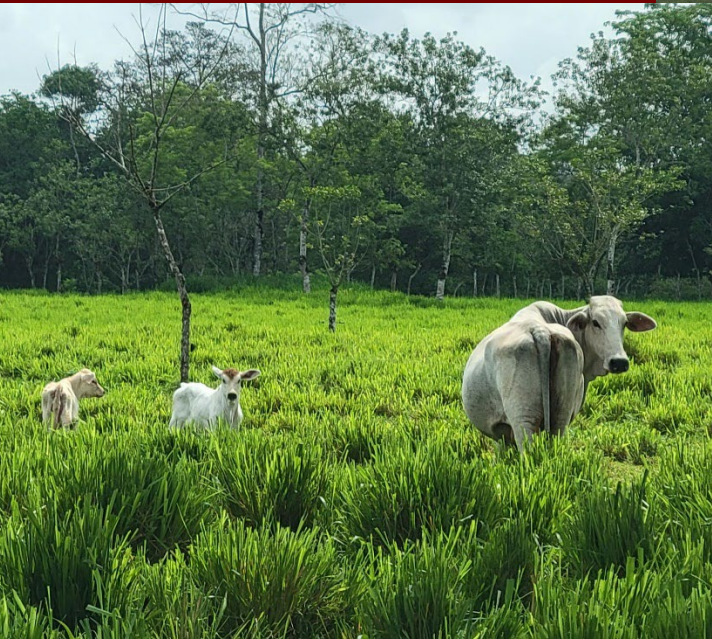


Animal Science

Animal Science

Forage , Nutrition

Beef Cattle Production



Animal Science

Local Farm to Market Dairy:
Mozzarella Cheese Making



Food Sciences

Large Dairy Factory:
Ice Cream, Yogurt, Milk



Plant Sciences



High Elevation- Cloud Forest Crops



Rainforest and plant biodiversity



Coffee roasting & quality evaluation



Soil & Water Sciences



Final Workshops: Student Research Presentations



Final Defense: Student Research Presentations



Contrasting Agriculture Production

Costa Rica	Florida	Texas	Puerto Rico
<ul style="list-style-type: none">• 1.3 Million cattle in Costa Rica	<ul style="list-style-type: none">• 886 Thousand cattle in Florida	<ul style="list-style-type: none">• 12 Million cattle in Texas	<ul style="list-style-type: none">• 1.5 Million cattle in Puerto Rico
<ul style="list-style-type: none">• Brahman influenced cattle	<ul style="list-style-type: none">• Have several cattle breeds commonly used for beef production.	<ul style="list-style-type: none">• At least ¼ British, No more than ½ Continental, and No more than ¼ Bos indicus.	<ul style="list-style-type: none">• Have several cattle breeds commonly used for dairy production.

Transition to Graduate School:

Impact of Faculty:Student 1:1 time

Twice as many undergrads go onto grad school with both faculty led tours coupled with USDA internships than internships alone.

START NOW TO REAP THE REWARDS LATER

DR SHAD D. NELSON

With Dr Randy L. Stanko and Dr M. Consuelo Donato-Molina



START NOW TO REAP THE REWARDS LATER

DR SHAD NELSON AND HIS TEAM, BASED AT TEXAS A&M UNIVERSITY-KINGSVILLE IN THE US, ARE PASSIONATE ABOUT INCREASING THE NUMBER OF HISPANICS WITH ADVANCED DEGREES IN THE SCIENCES. THE START NOW PROGRAMME INVOLVES A UNIQUE TWO-WEEK INTERNATIONAL STUDY IN COSTA RICA, CENTRAL AMERICA, WHICH HAS ALREADY BOOSTED THE NUMBER PURSUING GRADUATE SCHOOL

HELPING STUDENTS GO FURTHER

The international study abroad research centered workshop experience in Costa Rica led to a higher percentage of student participants going on to graduate school, compared to students that only had a career-oriented internship as an undergraduate in the same START NOW programme.

Students being trained by professors led to higher confidence and desire to pursue graduate school compared to peers seeking agriculture-oriented BS degrees.

Students being trained by professors led to higher confidence and desire to pursue graduate school compared to peers seeking agriculture-oriented BS degrees.

A total of 10 TAMU Kingsville undergraduates students attended the Costa Rica workshop led by faculty research mentors, 7 of which we see at graduate school (77.8%)

Shad concludes, "To increase the number of Hispanics with advanced degrees in the sciences, it is critical to create an atmosphere of faculty-researcher partnership for undergraduates in research."

International collaborations are vital and study abroad experiences can influence student achievement for undergraduate and science careers, and graduate school preparation."

Falls is finished - If an employer was given a fair opportunity at contributing, progress and scientific achievement would have been.

Hispanic Americans are one of the minority populations that are underrepresented in agricultural sciences and research fields,

so efforts are being made to improve undergraduate Hispanic participation, through experiential learning in soil science, plant science and environmental science. This is one of the key motivations behind the creation of the START NOW (Student Training in Agricultural Research Techniques by Non-Occupational Workers) programme, which is designed to complement existing educational and academic programmes, and help Hispanic undergraduates become more competitive and better represented within agricultural sciences and research.

Dr Shad D. Nelson is a professor and dean based within the Dick and Mary Lewis Klesing College of Agriculture and Natural Resources, at Texas A&M University-Kingsville in the US. He is a passionate leader of the START NOW programme and recognizes how important such programmes are at fostering inclusion and providing opportunities to underrepresented minorities within agricultural sciences.

Dr Shad D. Nelson is a professor and dean based within the Dick and Mary Lewis Klesing College of Agriculture and Natural Resources, at Texas A&M University-Kingsville in the US. He is a passionate leader of the START NOW programme and recognizes how important such programmes are at fostering inclusion and providing opportunities to underrepresented minorities within agricultural sciences.

WHAT MAKES START NOW SO UNIQUE? Many minority students are first-generation college students and as a result the first to obtain a college degree in their family -

experience in Costa Rica. The programme introduces students to sustainable tropical agricultural practices and trains them through applied research-focused workshops. The undergraduate students are given the opportunity to work with other students and faculty members from four different Hispanic-serving universities: Texas A&M University-Kingsville, University of Texas at El Paso, Florida International University and University of Puerto Rico-Mayaguez.

HOW IS THE PROGRAMME STRUCTURED? The START NOW programme is competitive, but once the students are selected, they go through preparatory training workshops before studying abroad. In Costa Rica, students visit agricultural operations, research companies, farms and rural community businesses," explains Shad. "They learn about sustainable agricultural practices incorporating soil health and water quality management, highland and low valley crop production and animal husbandry. Students are also trained in proper research sampling techniques, taking soil and water samples from various agricultural sites, followed by sample analysis at the Texas A&M University Salina Center located in San Salinas, Costa Rica. "Students work in collaborative teams and present their research findings prior to leaving Costa Rica.

WHY ARE THE TIME STUDENTS SPEND WITH FACULTY SO IMPORTANT? Undergraduate students are first-generation college students and as a result the first to obtain a college degree in their family -

therefore, graduate school is not something many of them would consider automatically an existing college. "When students are engaged in research through interdisciplinary learning in soil science, plant science and environmental science, they gain confidence, as they know an adult peer believes in their abilities," says Shad. "Students not only see their skills develop, they also learn they have an aptitude for science." Importantly, the two-week study abroad experience allows students and faculty members to spend quality time together, as well as having discussions during the discovery process. This can help students understand their potential and realize they are ready for graduate school.

WHAT HIGHLIGHTS AND SUCCESS STORIES HAS THE PROGRAMME SEEN SO FAR? The START NOW programme has already shown that if institutions want to increase the number of minorities in careers that require MS or PhD degrees, in alignment with faculty research early on in the college experience is critical. "This impact empowers students and faculty members by the two-week Costa Rica trip has led to a much higher percentage of students going on to graduate school than compared to those who only had a career-focused course internship with US Department of Agriculture agency partners," explains Shad. "The number of doctoral graduates from minority Hispanic populations is low, and without programmes like this that support close faculty-student interactions, these numbers will continue to be suppressed in higher education institutions. Funding support for undergraduate research

SHAD'S TOP TIPS FOR STUDENTS

- 1 - Be proactive, where possible. If you want to be part of a research project, then approach your faculty member prior to your internship. They will likely help you in any way they can. Your future is there to help you and if you show that you are willing, you will be rewarded.
- 2 - Through the course of your studies and engaging in research, you will find that you have a lot of support from your faculty. There is a lot of untapped potential hidden under the surface and having it out is one of the most satisfying feelings.
- 3 - Take every opportunity - If you can gain experience from a professional mentor then do so. Their life learning could change your life and help you to find a career that you love.



DR SHAD D. NELSON
Professor and Dean, Dick and Mary Lewis Klesing College of Agriculture and Natural Resources, Texas A&M University-Kingsville, USA

FIELD OF RESEARCH
Soil, Plant and Water Sciences

RESEARCH PROJECT

START NOW is a programme that seeks to increase a Hispanic participation in agriculture through interdisciplinary learning in soil science, plant science and environmental science. The students who are selected take part in an international study abroad experience in Costa Rica.

FUNDER
USDA, NIFA Hispanic Serving Institutions
(Grant award no. 2016-58422-25542)

experience with faculty mentor engagement is essential, otherwise the long-term impacts are fewer in number, consisting of gaining graduate MS and PhD degrees."

DOES THE PROGRAMME BENEFIT PROFESSIONALS WHO ARE INVOLVED? Yes! Soil, plant, animal and environmental sciences are disciplines that require research and personal experiences that exist outside of the classroom. Information can be obtained from textbooks and conversations, but nothing beats working out in the field. The faculty members seek out START NOW students engaged in applied, hands-on learning workshops, which is beneficial to their own professional development. Of course, an underrepresented student is playing a different role of science for the first time in an increasingly rural setting.

The USDA-NIFA HSI Collaborative grants program

This collaborative approach has branched out to other grant funding programs to support faculty-led science experiential training tours, internship and graduate school preparation programs

Brazil

Colombia

Guatemala

Mexico

Puerto Rico

Collaboration Among HSIs: The Mechanism for Student Success

- Hispanic Serving Institutions Collaborating Together can Serve as a Model to the Nation of how research with USDA agencies and Industry partners can help prepare our students for the career opportunities and/or graduate school in the agricultural, natural resources and biological sciences

If you are an advocate for Student Success
and their professional development:

We encourage you to follow this model
GO START NOW !!

The USDA-NIFA HSI grants program is an excellent example of how we can strategically advance Hispanics and diversify the American workforce in the USDA or other Federal agencies.

There is a critical need to continue and enhance funding towards “faculty:student driven” higher education programs of excellence through funding sources like the USDA-NIFA HSI grant program

Many Thanks to:

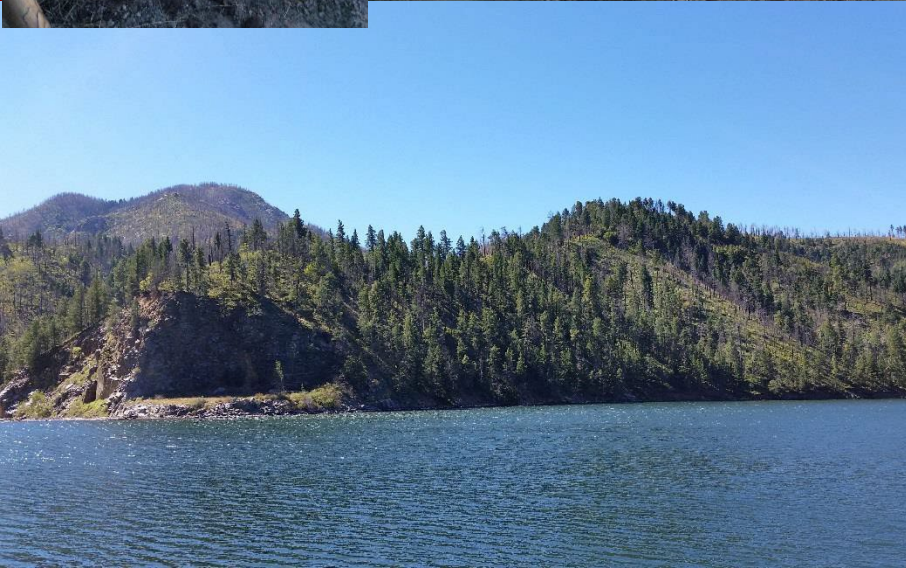
USDA-NIFA Hispanic Serving Institutions grants
program

and

Dr. Irma Lawrence
and her dedication to advancing
the mission of the USDA workforce

Questions?

Multi-State Soil Judging Teams



Soil Judging Team

