Myakka

A UF/IFAS SOIL AND WATER SCIENCE DEPARTMENT PUBLICATION

VOLUME 15 | NUMBER 2 | SUMMER 2015

2015 International Year of Soils

During the 68th United Nations General Assembly, 2015 was declared the International Year of Soils (IYS), primarily to raise global "awareness and understanding of the importance of soils for food security and essential ecosystem functions," including protecting the environment.

http://www.fao.org/soils-2015

A nation that destroys its soils destroys itself.
— Franklin D. Roosevelt

A Message from Dr. Jack Payne
Senior Vice President for Agriculture and Natural Resources, UF/IFAS

Soil and water serve as the foundation for urban, agricultural, and natural ecosystems. We've known this for so long that the UF/IFAS Soil & Water Science Department (SWSD) was publishing soil science research as early as 1888. Ever since, its faculty has made major contributions to help solve soil and water quality challenges for Florida, the nation and the world.

That running head start positions the department as one of the leading sources of expertise to tackle challenges not dreamed of in the 19th century: climate change, sea-level rise, and meeting the food and fiber needs of a projected 9.7 billion people in 2050. It has also become immensely more complicated to decrease rates of soil degradation and to protect natural resources.

People tend to take soil for granted. They overlook that life as we know it could not exist without soil. Soil science is so important in the management and protection of this hidden treasure that supports food production and natural resources.

I'm proud of SWSD's leadership in teaching, research, and Extension programs to improve the productivity of agriculture with environmentally sound management practices.

UF's first soil-related master's degree was awarded to John Hazard in 1925. A formal soils department was established in 1933, and the first PhD was awarded to Frank Bartlett in 1955. SWSD has provided steady service to clientele in agriculture and natural resources for more than a century.

Since your work rarely gets widespread public notice, I'm gratified to see that the United Nations has declared 2015 the **International Year of Soils**. Congratulations, SWSD, for your outstanding accomplishments and on your year in the spotlight. Keep up the good work!

Myakka (the Seminole word for "big waters") gives a special identity to our Department, as it is also the name of Florida's State Soil, Myakka fine sand.

UF IFAS UNIVERSITY of FLORIDA

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A Message from the Chair - K. Ramesh Reddy

UF/IFAS Soil and Water Science research, teaching, and Extension programs (located at 9 RECs and Gainesville) are well situated to address critical soil and water quality issues in a wide range of ecosystems. These include agricultural lands, forested lands, range lands, urban lands, and wetlands and aquatic systems. As we celebrate 2015 as the International Year of Soils (IYS), it is important to reflect on the history and origin of the SWSD and its statewide programs.

In this newsletter we highlight a few of our former students' success stories. In addition, in previous newsletters (Summer 2005 and 2010) we highlighted several of our graduate students. Our alumni serve as ambassadors for the SWSD and for the University of Florida–we are proud of them and derive great satisfaction that the Department has made a small difference in shaping their lives and careers, as the Department has done throughout its history.

Soils-related research in Florida was first published in 1888 by the newly established Experiment Station of the State Agricultural College of Lake City, Florida. In 1907, the Experiment Station was moved from Lake City to Gainesville. The Experiment Station was housed in Newell Hall (at right), built in 1908. A.W. Blair (1899–1910), a chemist, probably should be considered as a pioneer in Florida soils research. His experiments included the use of lysimeters to study nutrient leaching. This research was followed by S.E. Collison (1910–1920), who conducted detailed studies on nutrient leaching in Florida sandy soils. In 1925 several sub-disciplines, including physics, chemistry, mineralogy, and microbiology, were added to the soil science program. The first MS degree was awarded in 1925. Scientists in the early part of the 20th Century recognized the importance of two major soil types in Florida, organic (Histosols) and flatwood (Spodosols) soils.

UF/IFAS File Photo

In 1933, the **Department of Chemistry and Soil** was established, with R.W. Ruprecht (1920–1937) as the head. In 1937, the Department was re-organized with R.V. Allison (1937–1944) as the new head. In 1939, the name was changed to the **Soils Department**. The Department expanded with several post-war appointments in 1946, with F.B. Smith as department head (1945–1965), followed by C.F. Eno (1966–1983). The name of the Department was changed to **Soil Science** in 1971 and to **Soil and Water Science** in 1992. Brian McNeal served as the Department chair (1983–1989), followed by Jerry Kidder as interim chair (1989–1990); George O'Connor (1990–1994), Randy Brown (1994–2000), and K. Ramesh Reddy (2000–to date). The first PhD degree in soils was awarded in 1955 (since then, over 260 doctorate degrees have been awarded). Five graduate students received the Emil Truog Soil Science Award for the best doctoral dissertation (given by the Soil Science Society of America–one award given per year). Our faculty are well recognized at national and international awards by several professional societies.

For almost 100 years, SWS faculty, staff and students have made significant contributions to improving the productivity of Florida's agriculture and have contributed to soil and water science research at national and international levels. During the past decade, the Department and IFAS went through tough times due to severe budget cuts. The result has been a significant reduction in state-funded faculty positions that challenged us to find cost-effective ways to maintain our teaching, research and Extension programs. Thanks to the State of Florida for providing additional funds to support the work load increase of our faculty. As we celebrate 2015 as the International Year of Soils, the Department was fortunate get several new faculty positions both on campus and at RECs to improve intellectual capacity to maintain excellence in our programs. As we move forward, we will use these resources to effectively play a key role in addressing soil and water issues as related to food security, climate change, sea level rise, public health, and protection of natural resources.

The Future of Soil Science: Pedodrones - *Mary Collins*

Many advances in pedology have been the result of military needs or exploration by NASA. In the near future the use of unmanned aerial vehicles (e.g., drones) developed by the military and NASA's technology to explore Mars will be incorporated into soil science. The field soil scientists' tools in much of the 20th Century were a shovel and an auger with a black and white aerial photo, and we walked across the fields. In the 1980s the birth of the ground-penetrating radar (developed by NASA and the military) greatly increased the speed and depth with which we could do our field work. As a result of the first Gulf War (1990s), global positioning systems and new software programs were introduced to accurately locate one's position in the field and create three-dimensional models of soils. The new millennium (2000s) changed pedology from a field-based science to mostly a computer-based science. Thus, soil scientists became GIS specialists. The 2010s and well beyond will involve drones (e.g., pedodrones). These pedodrones with computer processing/camera and equipment similar to what is presently used by NASA to analyze the surface of Mars will do our fieldwork. Pedologists will control the pedodrones using a laptop computer as the pedodrones fly over the fields sensing ground features and sending the information back by satellite. Drones are already used to survey agricultural crops, count wildlife, and monitor livestock.

The Role of Soil Science in Sustaining Forested Ecosystems - *P.K. Nair*

P. K. Nair (second from right) with Brazilian colleagues at a silvopastoral (Eucalyptus sp. + Brachiaria sp.) research site of EMBRAPA (Brazilian Agricultural Research Enterprise) near Belo Horizonte, Minas Gerais, Brazil, July 2015.

Although soil science began to emerge as a discipline during the mid-to-late 1800s, it has only developed into a major discipline since the 1950s, when heavy investments in agricultural research led to numerous scientific advances. Almost all such advances had strong emphases and impacts on enhancing agricultural (food) production. Soil science, however, is – ought to be – much more than about supporting crop production.

For example, globally forests cover an estimated 4 billion hectares (~ 30% of land area, compared with about 11% under arable agriculture), of which planted forests account for only about 54 million ha. Arguably, the advances in soil science have had some impacts in the management of planted forests, but the vast land mass of the nearly 3.5 billion ha under natural forests have generally not been affected by the advances in soil science. These lands make enormous contributions to human prosperity and even survival. There are abundant poetic as well as scientific edifices about the virtues of forests – oxygen supply, water purification, climate regulation, habitat protection, and a whole host of such ecosystem services, not to mention the innumerable array of forest products. Robust and rigorous methods do not exist, unfortunately, for valuing these services.

Historical examples of soil mismanagement leading to the decline of mighty civilizations such as the Maya Empire are too powerful to be ignored. Yet, neglect and mismanagement of soils continue unabated, leading to massive soil degradation in various ways – wind and water erosion, fertility decline, salinization, to name a few. Land-use systems of the future are poised to be more than single-species enterprises; integrated systems consisting of different components such as crops, trees, shrubs, animals, and aquatic species are increasingly becoming popular. We need a rethinking on the directions in which soil science needs to be developed for catering to the needs of these diverse systems and exploiting the opportunities provided by them. After all, soils support not just crops, but life, of all sorts, on Earth.

Our PhD Graduates

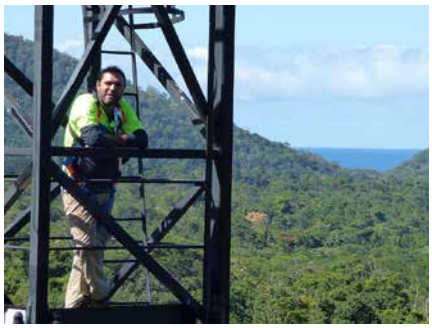
Sampson Agyin-Birikorang, PhD 2006

Sampson is currently a Senior Scientist with the Soil Fertility and Plant Nutrition Division of the International Fertilizer Development Center (IFDC), an international center for soil fertility and agricultural development. He conducts research focused on improving nutrient use efficiency and facilitates the transfer of innovative agro-technologies. In addition to research, he provides technical assistance to several projects in Sub-Saharan Africa and southern Asia on Integrated Soil Fertility Management (ISFM) practices.

Lisa G. Chambers, PhD 2012

Lisa is an Assistant Professor of Biology at the University of Central Florida. In addition to teaching ecology and wetland courses, her Aquatic Biogeochemistry Lab conducts research focused on nutrient cycling and coastal resiliency.

Alex Cheesman, PhD 2010



Alex is a Postdoctoral Research Fellow at James Cook University, Australia. After graduating from UF, he worked with the Smithsonian Tropical Research Institute in Panama before moving to Oz in 2013. He currently works on determining the impact of climate change on tropical tree growth and survival, as well as the secondary effects this will have upon ecosystem carbon and nutrient cycling.

Myrlene Chrysostome, PhD 2005

Myrlene has been the Natural Resources and Environmental Manager at the United States Agency for International Development (USAID) Mission in Haiti for over seven years. She is the biodiversity and global climate change person of contact for the Mission. She actively participates in agriculture and natural resource program design and is currently managing several portfolios, including cooperation with the Consultative Group for International Agricultural Research (CGIAR) centers, the Haiti component of a regional project, the Caribbean Marine Biodiversity Program, and a recently awarded cooperative agreement with the University of Florida: Support to Agricultural Research and Development Program.

George W. (Bill) Easterwood, PhD 1987

During the past 24 years, Bill has worked for Yara International (formerly Norsk Hydro), one of the world's largest chemical fertilizer manufacturers, and is based in the North American Corporate Office in Tampa. He serves as Director of Agronomic Services and is responsible for product development and marketing, product agronomic and economic assessment, information transfer to dealers and growers and special projects with State and Federal agencies regarding fertilizer technical issues. His current research interest is nutritional initiation of plant protection mechanisms to help mitigate HLB in Florida Citrus and zebra chip in potato until a plant genetic alternative is developed.

Our PhD Graduates

Thomas R. Fox, PhD 1989

Tom is the Honorable Garland Gray Professor of Forestry in the Department of Forest Resources and Environmental Conservation at Virginia Tech. Tom's research is in forest soils and silviculture of both natural and planted forests. His goal is to link properties and processes in forest soils with forest ecophysiology and silvicultural practices to improve productivity and sustainability of forest ecosystems in United States and Latin America.

Davie Kadyampakeni, PhD 2012

Davie is currently working for the International Water Management Institute (IWMI) as a researcher for Agricultural Water Management (AWM) in West Africa. His research focuses on implementing improved AWM practices in West Africa and building capacity of irrigation practitioners and institutions. He leads the IWMI components on five projects targeting agricultural water management, small-scale irrigation, soil health, and climate change, agriculture and food security.

Konstantinos C. Makris, PhD 2004

Konstantinos is an Assistant Professor of Environmental Health in the Cyprus International Institute for Environmental and Public Health in association with Harvard School of Public Health within the Cyprus University of Technology. His research interests focus on water and human health issues, with a primary emphasis on the assessment of human exposures to commonly-occurring environmental chemicals, such as in water and food items, packaging materials and numerous consumer products.

Kirandeep Mann, PhD 2009

Kirandeep works on research and development of proprietary and new products of The Mosaic Company. She is responsible for evaluating products, interpreting research data from global agronomy research trials and delivering key information to agronomy, marketing and sales teams. Kiran lives in Plymouth, Minnesota with her husband and two sons.

Dakshina Murthy, PhD 2012

Dakshina works as a Special Project Scientist (Crop Modeling) at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India. His main research responsibilities include evaluating promising technologies, investments, and policy reforms using a coordinated suite of biophysical and socioeconomic models under the Global Futures and Strategic Foresight (GFSF) project led by the International Food Policy Research Institute (IFPRI) and funded by Bill and Melinda Gates Foundation and CRP-PIM. He is also actively involved in the Agricultural Model Intercomparison and Improvement Project (AgMIP) a major international initiative working on linking the climate, crop, and economic modeling communities to study the impact of climate change.

Our PhD Graduates

Augustine Obour, PhD 2010

Augustine is currently an Assistant Professor of Soil Science at Kansas State University in Manhattan, Kansas. His research efforts are focused on soil fertility and nutrient management, soil management, nutrient cycling, soil health, and bioenergy crop production in water-limited environments. Obour says, "The hands-on research training I received in the Soil and Water Science Department at the University of Florida prepared me well for my current position."

Julie C. Padowski, PhD 2011

Julie is a Clinical Assistant Professor at Washington State University in Pullman WA. She works closely with the Center for Environmental Research, Education and Outreach (CEREO) and the State of Washington Water Research Center to develop and implement interdisciplinary research projects focused on water resources issues.

Rajendra Paudel, PhD 2011

Rajendra works as a Hydrologist with the Everglades Foundation in Palmetto Bay, Florida. His work at the Foundation primarily focuses on conducting hydrologic analyses and modeling for the development of integrated water management strategies to restore and protect the Everglades. His responsibilities also include providing expert analysis on scientific information, particularly hydrologic, water quality, and ecological information to assist in the development of the Everglades restoration alternatives.

Leonard J. Scinto, PhD 1997

Len is an Associate Professor in the Department of Earth and Environment, the Director of the Soil/Sediment Biogeochemistry Laboratory and the Associate Director of the Southeast Environmental Research Center at Florida International University. He is an aquatic biogeochemist who has focused his research on the mechanistic linkages between key environmental drivers and ecosystem responses in lake, wetland, and estuarine systems. He has extensive experience in Everglades ecology and restoration, in the development of treatment wetlands, and in shallow natural and man-made lakes of South Florida. He teaches a variety of courses at the undergraduate and graduate levels including Environmental Resource Management, Wetlands Ecology, Water Resources, and the Science of Sustainability.

Gustavo Vasques, PhD 2009

After spending a short period as Assistant Professor at the Federal Rural University of Rio de Janeiro, Gustavo is currently a soil researcher at the Brazilian Agricultural Research Corporation (EMBRAPA) in Rio de Janeiro. He is married to Patricia and has a three-year-old son, Luca. His research concentrates on Pedometrics and Digital Soil Mapping, the same topics of his PhD dissertation at the SWSD.

Current and former students, faculty, staff and departmental affiliates: Join the department's new LinkedIn group, "University of Florida Soil and Water Science Department," to network with and learn from fellow alumni and students: https://www.linkedin.com/grp/home?gid=8390114.

The Future of Soil Science: Soils Sustain Life - *Nick Comerford*

I was recently asked the question, "What is the future of Soil Science?" Why I should know the answer to this escapes me…but having been asked, let me address it. If you count up my years working in Soil Science since graduating with a B.S. degree, it totals to 41. My profession has given me the opportunity to live and work in Minnesota, Washington, New York, Florida, New Zealand and Brazil. I mapped the soils in the foothills of Mt. Rainer, dug in soils along the Amazon influenced by Pre-Columbian Indians, walked inside the mouth of a volcano and taught courses in Portuguese. For that last one I apologize to all Brazilian students who had to suffer through my courses. Given this experience, I am confident saying that this is the best time in my lifetime to be a Soil Scientist. Why? Because we need to -- feed 9 billion people on less land in the near future, detoxify soils used as dumping grounds, understand the most biodiverse ecosystem and food web on the planet, and create new land management techniques that maintain soil quality and health so soil ecosystem services can be delivered to future generations. These are only some of the challenges we face today and into the future. Why is soil important? Because when we total up the monetary value of ecosystem services in which soil plays a pivotal role, the value of soil dwarfs all other components of the ecosystem. Soils sustain life, and that is why the United Nations has named 2015 the International Year of Soils.

Teach the Teachers Workshop

The United Nations declared 2015 as the International Year of Soils in recognition of the importance that soil has in sustaining life on our planet. The SWSD at the University of Florida, in collaboration with the Soil Science Society of America, offered a "Teach the Teachers" workshop to Middle School and High School teachers. Soil Science is a STEM topic that includes Chemistry, Physics and Biology. The focal groups of this workshop were teachers in these disciplines as well as in Agriculture and Natural Resources.

Florida has a unique soil environment that includes wetlands, highly weathered soils, and organic soils. This workshop was offered at seven locations around the state at UF's Research and Education Centers (Ft. Lauderdale, Ft. Pierce, Immokalee, Jay, Ona, Quincy and Wimauma). The course was attended by 75 teachers. Teachers were exposed to the basics of soil science through lecture materials that they can use in class (with pre-prepared scripts) and demonstrations, along with a list of supporting websites and materials. Soil science covers an expansive range of topics that has been narrowed down to those most relevant for teachers: basic soil properties, life in the soil, and soil's protection of the environment. Thanks to Nick Comerford for providing the leadership in coordinating this effort. Thanks to SWSD faculty: James Bonczek, Samira Daroub, Rex Ellis, Heather Enloe, Willie Harris, Zhenli He, Kelly Morgan, Gurpal Toor, Wes Wood, Alan Wright, and Libbie Johnson (Extension Agent, Escambia County) for their effort in developing the material and teaching the course. For additional information contact: Nick Comerford at nbc@ufl.edu.

Also visit: http://nfrec.ifas.ufl.edu/year_of_soil/

Congratulations! Summer 2015 Graduates!

PhD

Marcel Barbier (Li & Liu)
Biswanath Dari (Nair & Mylavarapu)
Mriganka De (Toor)
Mary Lusk (Toor & P. Inglett)
Debjani Sihi (P. Inglett)

MS

Clarence Bodrey (Daroub)
Rosemary Collins (Mylavarapu)
Ann Couch (Hochmuth & Rowland)
Francisca Hinz (K.S. Inglett)
Tiantian Li (Li & Gao)
Sara Mechtensimer (Toor)
Jianru Shi (O'Connor & Wilkie)
Tracey Wasylik (Moore & Daroub)

BS - SWS (Advisor - Bonczek)

Kelly Ladd (Spring 2015)

BS - IS-EMANR (Advisor - Curry)

Jennifer Trevis

SWS Minor (Advisor - Bonczek)

Susan Rodriguez

Faculty, Staff and Students

Congratulations to faculty and students for their outstanding achievements:

Soil Science Society of America Fellow: This is the highest honor bestowed by our professional society. For the year 2015, Zhenli He was a recipient of this award.

Vimala Nair was profiled in *A Day in the Life* series in Soil Horizons Volume 56, Issue 4 July-August 2015.

Mark Clark was the recipient of the 2015 UF Water Institute (WI) Faculty Fellow Award, recognized for his outstanding contributions to interdisciplinary water research, extension and educational programs.

Anna Normand (Reddy) – Received John A Knauss Marine Policy Fellowship. She was selected to serve as a Legislative Fellow in Washington DC for one year (February 2016 - January 2017).

Tenure and Promotion

Susan Curry – Promoted to Senior Lecturer
Kelly Morgan – Promoted to Full Professor
Max Teplitski – Promoted to Full Professor

CALS Scholarships for 2015-2016

Graduate Awards

Moshen Tootoonchi (Daroub and Bahadha) received the A.S. Herlong Sr. Scholarship.
Paul Julian (Wright) was awarded the Dee Ann Connor Scholarship given by the Agricultural Women's Club.
Marcos Moraes (Teplitski and Hochmuth) and Elise Morrison (Ogram and Turner) received the William C. and Bertha M. Cornett Fellowship.
Ashley Witkowski (Daroub) received the Florida Fertilizer and Agrichemical Association Scholarship.

Undergraduate Awards - Environmental Management in Agriculture and Natural Resources

Stephanie Fisher (Curry) and Chelsea Hazlett (Curry) were awarded the Doris Lowe and Earl and Verna Lowe Scholarship.

Dean's List for Spring 2015

Sara Baker (Curry)
Katherine Galluscio (Bonczek)
Lacey Hancotte (Bonczek)

Welcome New Students Fall 2015

PhD

Ryan Blaustein (Teplitski)
Rose Collins (Mylavarapu)
Peng Gao (Ma & Wilson)

MS

Stephanie Armstrong (Ma)
Sinan Asal (Toor)
Kenton Beal (Clark)
Natasha Darre (Toor)
David Day (Wilson)
Kristi Dobra (Toor)
Joseph Geisel (Enloe & Mulvaney)
Drew Land (Mylavarapu)

MS

Leah LaPlaca (Osborne)
Sara Miller (Osborne)
Melissa Savoy (Clark)
Jessica Sharpe (Ogram)
Timothy Sink (Schumann)
Kara Verge (Jawitz)
Haley West (Wright)

BS - SWS (Advisor - Bonczek)

Jennifer Sarchapone

BS - IS-EMANR (Advisor - Curry)

Jesse Baughman
Aaron Bender

BS - IS-EMANR (Advisor - Curry)

Dalton Bodie
Christopher Butler
Victoria Carpenter
William Drawdy
Paul Duff
Viness Eugene
Douglas Forness
Kenneth Gorham
Angelica Karones
Thomas Kenny
Delaney O'Brien
Deborah Roberts
Ashia Sonnenberg

Join us at...

The 16th Annual Soil and Water Science Research Forum

The 16th Annual Soil and Water Science Research Forum will be held September 17, 2015, in Gainesville, Florida. The forum is designed to bring together representatives from state and federal agencies, private industry, faculty, graduate students, and prospective students interested in soil and water science. The forum will provide an opportunity for all those interested in soil and water science to interact with our students, faculty, and administrators on campus. Our Keynote Speaker will be Dr. Andrew Sharpley, Professor of Soils and Water Quality, University of Arkansas, speaking on *Exploring Phosphorus Paradoxes to Avoid Unintended Consequences*. We look forward to your participation in the forum. If you are planning to attend, please register at http://soils.ifas.ufl.edu/research/forum/.

For additional information, contact James Jawitz at: Jawitz@ufl.edu.