

UF/IFAS

Range Cattle Research & Education Center NEWS

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IN THIS ISSUE

Can Pastures Help Mitigate Climate Change?

by Dr. Maria Silveira



This article was based on a document recently published in the Florida Cattleman & Livestock Journal.

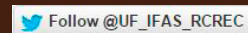
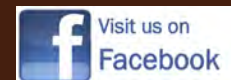
Agriculture has historically provided much more than just food. It offers a multitude of environmental services and social goods that are critical to society. In addition to the increased pressure to meet global demand for food, today's agriculture also faces the challenge of balancing economic and environmental objectives. Weather uncertainties and extreme flood and drought events caused by climate change pose additional threats to agricultural production. However, these challenges also provide new opportunities for farmers to play an active role on climate change mitigation. In many parts of the world, there has been significant emphasis on encouraging farmers to manage their natural resources in ways that enhance the provision

of ecosystem services to the wider society. The ability of agriculture to produce non-commodity outputs and the possibility of farmers to participate in carbon trading and offsets as well as payments for ecosystem services programs may offer new opportunities for agriculture to play an important role on climate change mitigation. However, despite the fact that soil carbon sequestration credit is gaining popularity in many countries like Australia and the U.S., these emerging agriculture-based climate credit programs are still facing many challenges, including lack of tools to accurately measure and monitor the benefits.

Although agriculture is often cited among the largest emitters of greenhouse gasses, it can also be an effective part of the solution. Global estimates suggest that greenhouse gas emissions from agriculture contribute to 10 to 12% of total anthropogenic emissions (Smith et. al, 2007). In 2018, U.S. EPA estimated that agriculture and forestry activities (including carbon dioxide emissions associated with agricultural electricity consumption) account for 9.3% of U.S. greenhouse gas emissions (U.S. EPA 2020). Within the agricultural sector, grazing lands (pastures and rangelands) are responsible for more than half of agricultural emissions. However, large uncertainties exist around these estimates. Decreasing

Connect With Us	4
Student News	6
Program Highlight	7
Upcoming Events	7
Recent Publications	8

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Soil profile of a typical perennial grass pasture in Florida.



Typical Spodosol profile characterized by accumulation of iron, aluminum, and humus in subsurface soil layers (spodic horizon).

agricultural greenhouse gas emissions is undoubtedly important; however, the lack of accurate estimates present a major challenge to understand agriculture's role on climate change mitigation potential. For instance, emission factors linked to beef cattle production (i.e., emissions from manure and enteric fermentation) vary significantly regionally and temporally. Differences in production efficiencies and introduction of new breeds as well as more efficient production methods can result in significant reductions in greenhouse gas emissions. There is also evidence suggesting significant regional differences in agricultural emissions with emissions increasing at a faster rate in developing countries than those in developed countries.

There is a growing body of evidence suggesting that agriculture can capture significant amounts of carbon from the atmosphere, mainly through soil carbon storage. Estimates suggest that cropland and grazing land soils can store up to 8.6 gigatons of carbon dioxide a year (IPCC, 2019). Increases in carbon storage in agricultural soils can offset approximately 12% of total U.S. greenhouse gas emissions (U.S. EPA 2020). Improved grazing land management, increased forage production and soil carbon stocks, and manure manage-

ment are among the most effective options to increase soil carbon sequestration and mitigation potential of livestock systems. Scientists are currently using integrated approaches to better understand and quantify the potential benefits and tradeoffs associated with implementation of different management practices specifically targeted at a particular region, climate and soil type, and cropping system. Ideally, the goal is to use science-based information as part of decision-support tools that will help farmers choose the most effective practices. Most of these practices also provide co-benefits including improvements in soil health, wildlife habitat, and farm resilience to drought and flooding. However, some of these practices are not being implemented, which suggests that multiple barriers to implementation still exist. A major hurdle is the lack of studies documenting the benefits and tradeoffs associated with different management practices. Lack of data also increases the uncertainty and errors associated with greenhouse emission estimates. Generat-

ing reliable metrics that can be used as benchmarks for ecosystem services credit buyers is a critical step in increasing adoption of conservation measures.

During the last 10 years, my research group has developed collaborative research to address the role of grazing lands on soil carbon and greenhouse mitigation. Presented below, are a few examples of these past and current research efforts related to these topics.

Results from our early studies demonstrated that both native rangelands and cultivated pastures are strong carbon sinks sequestering as much as $0.9 \text{ Mg C ha}^{-1} \text{ yr}^{-1}$ (Adewopo et al., 2014). Our data also demonstrated a strong effect of management on soil carbon sequestration potential. For instance, we observed that pasture intensification (i.e., introduction of more productive plant species such as conversion of native vegetation into warm-season grasses) and adoption of proper grazing and fertilization management strategies can be beneficial for enhancing C sequestration (Adewopo et al., 2015a; Xu et al., 2016). Our data also indicated that adoption of improved pasture management can enhance soil carbon stocks (0 to 12 inches soil depth) by 50% or the equivalent of ~ 1 metric ton of carbon per year. This research supports growing evidence that proper pasture management is beneficial for soil and ecosystem carbon sequestration in the long term. Our results also suggested that increases in soil carbon stock in response to improved pasture management may be susceptible to faster turnover and degradation, especially under warming climate scenarios (Xu et al., 2017a). In other words, the benefits associated with increased soil carbon sequestration could be easily reversed by increased temperature or improper management (i.e., overgrazing, inadequate soil fertility program, weed and brush infestation) (Silveira

et al., 2014; Adewopo et al., 2015b). In addition, data also suggested that adoption of improved pasture management practices are often beneficial to forage and livestock production, therefore, they may provide an incentive for producers to adopt strategies that enhance soil carbon sequestration while simultaneously increasing forage production. Results from our studies also indicated that long-term land use intensification affected the size, activity, and composition of soil microbial community (Xu et al., 2017b). Conversion of native rangeland into bahiagrass pasture increased soil microbial enzymes which suggested greater microbial activity. Data also suggested changes in microbial composition (e.g., fungal groups are more predominant in native rangelands versus bacterial groups in more intensively managed pasture systems) which are expected to affect ecosystem processes and functioning.

More recently, our involvement with the USDA Long-Term Agroecosystem Research (LTAR) network, a partnership among 18 research sites currently focused on the sustainable intensification of agricultural production, created additional opportunities for data collection and data analysis. For instance, in a recent study using a combination of eddy covariance and chamber measurements to estimate ecosystem carbon exchange and greenhouse gas emissions, we were able to quantify how quickly Florida native rangeland ecosystems recover after fire. Our data (Bracho et al., unpublished) demonstrated that native rangeland vegetation fully recovered its photosynthetic capacity 60 days following prescribed fire. Data demonstrated that native rangelands represent a strong carbon sink sequestering over 1.1 Mg C ha^{-1} per year. Similarly, native rangelands acts as methane sink offsetting between -21 and $-51 \text{ kg CO}_2\text{EQV ha}^{-1} \text{ yr}^{-1}$ as methane.



Eddy covariance tower measuring ecosystem carbon fluxes on a bahiagrass pasture.



Portable infrared gas analyzer used for soil respiration measurements.

Our ongoing research efforts continue to be focused on understanding carbon balance and dynamics in native and cultivated pastures, with special emphasis on determining how carbon is decomposed, protected, and stabilized in Florida's sandy coastal plain soils.

Literature cited

Adewopo, J.B., Silveira, M.L., Xu, S., Gerber, S., Sollenberger, L.E., and Martin, T. 2015a. Long-term grassland management intensification impacts on particle-size soil carbon fractions: evidence from ^{13}C natural

abundance. *Soil Science Society of America Journal*, 79:1198-1205.

Adewopo, J.B., Silveira, M.L., Xu, S., Gerber, S., Sollenberger, L.E., and Martin, T.A. 2015b. Management intensification effects on autotrophic and heterotrophic soil respiration in subtropical grasslands. *Ecological Indicators* 56:6-14

Adewopo, J.B., Silveira, M.L., Xu, S., Gerber, S., Sollenberger, L.E., and Martin, T. 2014. Management intensification impacts on soil and ecosystem carbon stocks in subtropical grasslands. *Soil Science Society of*

America Journal 78:977-986.

Intergovernmental Panel on Climate Change (IPCC), 2019: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)].

Silveira, M.L., Xu, S., Adewopo, J.B., Franzluebbers, A.J., and Buonadio, G. 2014. Grazing land intensification effects on soil C dynamics in aggregate size fractions of a Spodosol. *Geoderma* 230-231:185-193.

U.S. EPA. 2020. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2018. Available at: <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2018>.

Xu, S., Silveira, M.L., Ngatia, L.W., Normand, A.E., Sollenberger, L.E., Reddy, K.R. 2017a. Carbon and nitrogen pools in particle-size fractions as affected by sieving method and land use intensification. *Geoderma* 305:70-79.

Xu, S., Silveira, M.L., Inglett, K.S., Sollenberger, L.E., Gerber, S. 2017b. Soil microbial community responses to long-term land use intensification in subtropical grazing lands. *Geoderma*, 293:73-81.

Xu, S., Silveira, M.L., Inglett, K.S., Sollenberger, L.E., and Gerber, S. 2016. Effect of land-use conversion on ecosystem C stock and distribution

in subtropical grazing lands. *Plant and Soil*, 399:233-245.

Smith, P., D. Martino, Z. Cai, D. Gwary, H. Janzen, P. Kumar, B. McCarl, S. Ogle, F. O'Mara, C. Rice, B. Scholes, O. Sirotenko. 2007: Agriculture. In *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Questions, contact Dr. Silveira at mlas@ufl.edu or 863-735-1314 ext. 209.

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Articles published in the Florida Cattleman & Livestock Journal:

View these on our website at: <http://rcrec-ona.ifas.ufl.edu/publications/>

Ona Reports

Sept. 2021 - 'Creep-feeding supplementation to beef calves' - by Dr. Joao Vendramini

Oct. 2021 - 'Can pastures help mitigate climate change?' - by Dr. Maria Silveira

Nov. 2021 - 'Coyote Behavior: Lessons from northern landscapes with applications to the ranch' - by Dr. Hance Ellington

Florida Cattle Market Price Watch

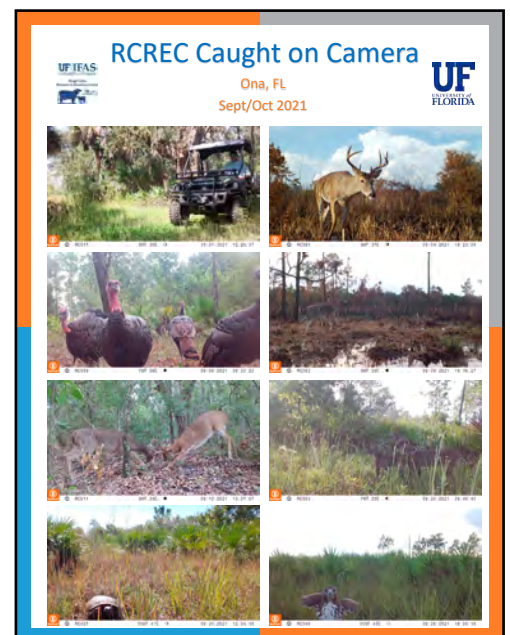
This helpful resource is provided monthly by Chris Prevatt, State Specialized Agent II, Beef Cattle and Forage Economics. View a complete listing of past reports on our website, [click here](#).



'Caught on Camera'

A monthly feature with images collected from RCREC game cameras mounted throughout the property. Provided by the Rangeland Wildlife Ecology Program.

View on our website at: <https://rcrec-ona.ifas.ufl.edu/faculty-directory/hance-ellington/>



New Videos

Ona Highlight Webinars

Save the date and join us for an upcoming Ona Highlight webinar. These informative presentations are held each month. They begin at 11:00 a.m. and last about 45 minutes.

See our online calendar for upcoming webinars, [here](#).

Recordings of recent webinars:

'Description of the DeLuca Preserve and How Working Landscapes May Be Pivotal to Protecting the Florida Grasshopper Sparrow' with guest Dr. Brent Sellers and guest presenters Dr. Reed Bowman and Fabby Baeza with Archbold Biological Station.

9/14/2021

Run time: 41.46 minutes

'Using Manured Management to Connect Distant Links of the Beef Supply Chain' with guest presenter Dr. Sheri Spiegel

10/19/2021

Run time: 42.33 minutes

PROGRAM RECORDINGS AVAILABLE

Become a Bluebird Watcher: Session 8, Sept. 11 - Preparing for the next nesting season/Project results.

Dr. Hance Ellington shared results and talked about what comes next for their bluebird research and he discussed how to clean, store, and prepare nest boxes for the next nesting season. Questions, contact Dr. Ellington e.ellington@ufl.edu.

80th Anniversary 'Virtual' Field day - Oct. 7

Our field day was held via Zoom with 46 persons attending. [Click here to go to our virtual classroom](#) in our website to see the video and PDF links of each PowerPoint.

Opening Remarks: Dr. Brent Sellers, Dr. Scott Angle, UF CALS Department Updates, & Cliff Coddington

Presentations:

Using Nutrition and Management to Alleviate Heat Stress in Grazing Cattle – Dr. Philippe Moriel

Beef Cattle Market Outlook - Chris Prevatt

Graduate Student Presentations: Jaime Garzon, Caetano Sales, & Leandro Vieira-Filho

Coyote Behavior: Lessons from the city and applications to the ranch – Dr. Hance Ellington

New Potential Warm-Season Perennial Grasses Propagated by Seed – Dr. Joao Vendramini

Update on Biosolids Research – Dr. Maria Silveira

DuraCor Tank Mixes for Pasture Weed Control – Dr. Brent Sellers

Listen or download the latest **Joe What? Podcasts:**



Oct. 2021 - Dr. Joao Vendramini interviewed Gary Fike with Kansas State University about the current scenarios for cattle feeding in the Mid-West USA and the trade-offs between carcass quantity and quality. (Run time: 14.48 min.)

These monthly podcasts can be found on:

[Podbean](#)

[YouTube](#)

[UF/IFAS Range Cattle REC Website](#)

You can view all of our our past webinars, program recordings, field day videos, and other recordings on YouTube or on our website's <https://rcrec-ona.ifas.ufl.edu/virtual-classroom/>

Student News



Tyler Buckley graduated in August 2021 with a MS in Wildlife Ecology and Conservation.

During his degree program he was advised by Dr. Raoul Boughton. He studied the reproductive ecology of wild pigs in South-Central Florida's rangelands. Specifically, he studied how they respond to trapping and if

that stimulates a density-dependent response through higher reproduction.

In January 2021 he began working for Flatwoods Consulting as an ecological specialist. He performs a variety of biological surveys for threatened and endangered species, which include Florida Scrub Jays, Florida Burrowing Owls, Gopher

tortoises, and more. Additionally he is involved with a collaborative project investigating the effects of phosphate mining on survival, reproduction, and dispersal of Florida Burrowing Owls.

Congratulations Tyler!



Caetano Sales continues his degree pursuit as he prepares to begin Extension employment in December.

Caetano began at the Center in January 2020 as an intern in the weed science program with Dr. Brent Sellers. Near the end of his internship, he accepted an offer from Dr. Sellers to continue his academic studies pursuing an MS degree in weed science. As a graduate research assistant his thesis focuses on evaluating the efficiency of Florpyrauxifen-benzyl & aminopyralid in Florida pastures.

During his time at the center, Caetano assisted with other studies in the weed science program including helping Dr. Sellers's other student, Clay Cooper. Clay's experiments, in Citrus County, look at management strategies for controlling brunswickgrass, also known as brown seed paspalum, a problematic weed for livestock producers of the area. In July 2021, a position at the University of Florida/IFAS Citrus County Extension Office as an Extension Agent opened. With the support of Dr. Sellers and Clay, Caetano applied for the job and got it.

Starting December 20th, Caetano will fill the full-time extension agent position, focusing on commercial agricultural producers, livestock operations, forage management, and crop production. This role incorporates providing better management practices, soil sampling, forage evaluation, weed identification, and management. Caetano will continue his studies and plans to graduate in 2022.

Congratulations Caetano!



Lais Lima received notice in October that she had been selected to be an Animal Science Grinter Fellowship Award recipient.

Congratulations Lais!

Lais recently began her Ph.D. studies under the advisement of Dr. Philippe Moriel.



Program Highlight

Environmental Lands Management Program

by Laura Bennett, Multi-County Livestock Agent - Pasco, Sumter, and Hernando Counties

The South Florida Beef Forage Program held the Environmental Lands Management Seminar and Tour on October 21 at Cross Bar Ranch in Pasco County. This property is owned and operated by Pinellas County and is used for a water well field. They also have cattle grazing, hay fields, and planted pines on the property as well. The purpose of this program was to provide information on cattle and grazing leases. It was designed for property managers who currently provide grazing leases or who would like to learn more about the benefits. A total of 18 attendees joined us from different organizations such as Water Management Districts, county governments, and FDACS. Guest speakers for the event included Dr. Betsey Boughton from Archbold Biological Research Station who spoke on natural resources; Drs. Maria Silveira and Brent Sellers from UF/IFAS RCREC who spoke on soil health and weed management, respectively. Christa Kirby provided information on stocking rates and forage management. Lauren Butler showed attendees what to look for in body condition of cattle and how that can change due to physiological demands on the cow. During the tour, weed management, soil testing, the importance of Brahman cattle, heifer management, and hay production were all either demonstrated or discussed. The committee that put on the event plans to use evaluations from the attendees to develop a similar program next year.



Christa Kirby presenting on stocking rates and forage management.



Stopping to visit (and feed) the Brahman cattle.

Upcoming Events

View our online calendar for more info on events and links to register:

<http://rcrec-ona.ifas.ufl.edu/calendar-of-events/>

Veteran's Day

– Nov. 11, The Center will be closed.

Thankful for all who have served and are serving in the U.S. Armed Forces. We are grateful for you!

Ona Soil and Water Science Program Highlight with Dr. Maria Silveira

– Nov. 16, 11:00 - 11:45 AM

Dr. Silveira will present "Carbon Balance in Florida Grazing Land Ecosystems."

Ona Graduate Student Highlight with Clay Cooper

– Dec. 14, 11:00 AM - 11:45 AM

Clay will present "Brunswickgrass management with hexazinone in bahiagrass pastures." Clay is a master's student under the advisement of Dr. Brent Sellers.

Ona Weed Science Program Highlight with Dr. Brent Sellers

– Jan. 11, 11:00 - 11:45 AM

Dr. Sellers will present "Ways to manage smutgrass past, present, and future."

38th Annual Florida Cattlemen's Institute & Allied Trade Show

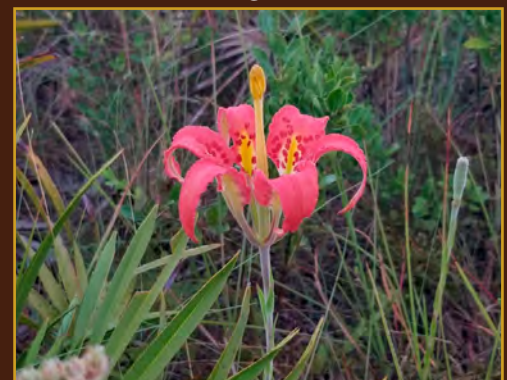
– Jan. 13, 11:00 - 11:45 AM

Highlands Co. Fair Grounds, Sebring. A free event, pre-registration not required.

Forage Management Tour & Workshop

– Mar. 10, 9:00 AM - 1:00 PM

Mudge Ranch, 1323 Loblolly Bay Road, LaBelleF Questions, contact: forages@ifas.ufl.edu



Pine Lily



Calving Season is Underway... Pictured here are Tom Fussell and Julie Warren who are just finishing up tagging and weighing a newborn calf. RCREC herds are checked daily and about 20 calves are processed each day during the peak of the calving season which runs from Oct. - Dec. with a few coming early in Sept. and a few late in Jan. Within 24 hours of birth all calves are tagged and weighed, males are castrated, and blood samples are taken from those who are a part of a study. Photo by Ryan Nevling.

Refereed Publications

Koen, E. L., Newton, E. J., & Ellington, E. H. (2021). Evaluating potential sources of invasive wild pigs in Ontario. *Ecology and Evolution*. DOI: 10.1002/ece3.8160.

Martin, L. J., Sellers, B. A., Devkota, P., Ferrell, J. A., Leon, R. G., & Vendramini, M. B. (2021). Tolerance of rhizome perennial peanut to glyphosate and triclopyr. *Weed Technology*, 55, 525-531.

UF/IFAS Range Cattle REC Faculty -

Dr. Brent Sellers, sellersb@ufl.edu - Pasture and Rangeland Weed Management

Dr. Maria Silveira, mlas@ufl.edu - Soil and Water Science

Dr. Joao Vendramini, jv@ufl.edu - Forage Management

Dr. Philippe Moriel, pmoriel@ufl.edu - Beef Cattle Nutrition & Management

Chris Prevatt, prevacc@ufl.edu - Beef Cattle and Forage Economics

Dr. Hance Ellington, e.ellington@ufl.edu - Grazinglands Wildlife Specialist

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ABOUT THIS NEWSLETTER

This newsletter is a publication of the UF/IFAS Range Cattle Research and Education Center (RCREC) located in South Central Florida in the heart of Florida's cattle country. Our goal is to keep you up to date on RCREC happenings, publications, research, faculty & student news, upcoming events and bring you beneficial information you can use in your beef cattle or forage operation.

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