College of Agricultural, Consumer and Environmental Sciences

*National Center on Carbon Management and Soil Health in Arid and Semi-Arid Environments*

# Carbon Management and Soil Health Newsletter

**Vol. 2. Issue 2. Fall 2024**

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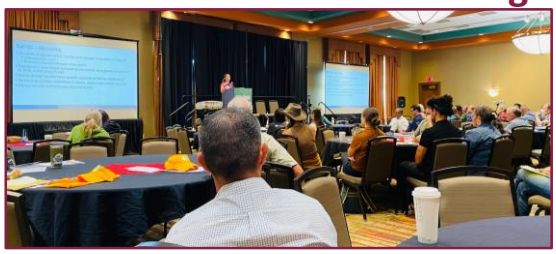
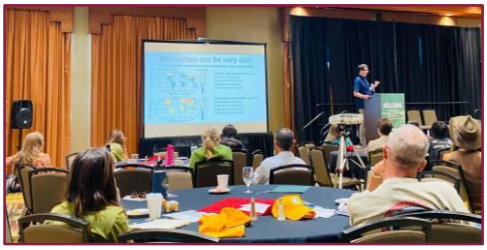
## Soil Health and Soil Carbon Conference This Summer was a Huge Success





NMSU College of ACES hosted a two-days (July 31–August 1) New Mexico Soil Health and Soil Carbon Conference in Albuquerque, NM. In this event, more than 100 people, including producers, extension agents, students, and research professionals, registered and participated. This conference was supported by Carbon Management and Soil Health Initiative at NMSU in cooperation with NMDA's Healthy Soil Program.

On the first day, Associate Dean of ACES at NMSU, Dr. Jay Lillywhite and Secretary of Agriculture, Jeff M. Witte, started the conference with welcome remarks. This was followed by networking sessions and professional talks from speakers representing various institutions, focusing on the measurement, monitoring, and reporting of soil health and carbon dynamics across croplands, rangelands, and natural and urban landscapes. The conference also included a roundtable discussion with past participants of NMDA Healthy Soil Program, and keynote speech from Tom Sidwell (a NM rancher) and Cole Viramontes (a NM farmer). On the second day, participants joined one of two field tours—focused on soil health and carbon management in cropland and rangeland—based on the interest of participants.

## Soil Health and Carbon Initiative Takes Center Stage at Annual Field Days

Producers and landowners are increasingly interested in soil health and carbon sequestration issues across New Mexico. Considering this, the Soil Health and Carbon Management Initiative projects are implemented across the state. Research outcomes and expert knowledge were shared at NMSU Agricultural Science Centers Clovis, Clayton, and Corona Ranch field days this year.

On August 6, researchers and students from ASC Clovis shared findings from ongoing carbon management and soil health projects. At Corona Ranch and Livestock Research Center field day on July 16, Dr. Rajan Ghimire presented a poster highlighting key efforts in rangeland soil health assessment, greenhouse gas and ecosystem flux measurements, and vegetation monitoring. Likewise, soil health and greenhouse gas emissions from livestock-grazed system was discussed during field tour at Clayton in September 16th.

## Publication highlights

### Enhancing soil carbon storage and soil health in a circular grass buffer system

In arid and semi-arid agriculture, innovative management solutions are needed to maximize water use efficiencies and address the growing challenges of climate change and unpredictable weather. An integration of circular grass buffer strips in row crop production can be a climate-resilient and sustainable solution, providing multiple ecological services, including carbon sequestration and improved soil health.

A study by Sapkota et al. (2024) found that after six years of grass establishment, soil organic carbon at 0–20 cm was 13% greater in buffer strips corn compared to conventional corn without grass buffers. Similarly, another study by Frene et al. (2024) from the same site reported 37% greater soil microbial biomass, mainly the fungal abundance, under buffer strip grass than conventional corn. For more details, please visit:

1. Sapkota et al., 2024. Regulation of surface and sub-surface soil organic carbon sequestration in water-limited landscapes with integration of circular perennial grass buffer strips. Applied Soil Ecology.

2. Frene et al., 2024. Evaluating the potential of circular grass buffer strips to promote fungal community and soil health in water-limited agroecosystems. Soil Ecology Letters.

### Soil carbon saturation deficit in semi-arid drylands

Water shortages, depleted soil organic carbon (SOC), and climate change impact are the major challenges of semi-arid drylands. Restoring perennial grasses in one of the solutions to improving soil health and storing carbon.

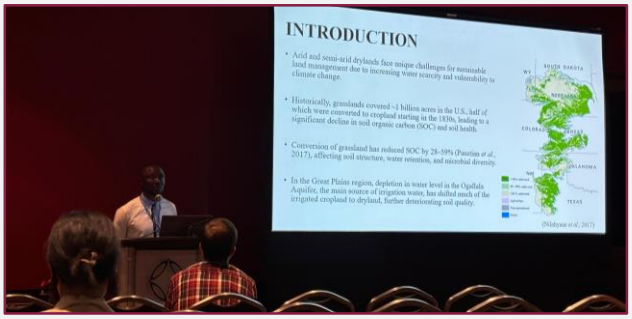
A recent study by Arije et al. (2024) compared soil in fields with winter wheat and perennial grasslands ranging from 3 to 20 years old. They found that SOC were highest in the 20-year grassland, showing the long-term benefits of perennial grass restoration. Overall, grassland restoration accumulated SOC at a rate of 0.46 megagrams per hectare per year. Similarly, the mineral-associated organic carbon saturation was expected in about 80 years at 0–15 cm and 230 years for 15–30 cm soil. This research highlights the potential of grassland restoration for carbon storage and sustainability of dryland ecosystems, providing a path forward for addressing climate change in these fragile ecosystems.

For more details, please visit:

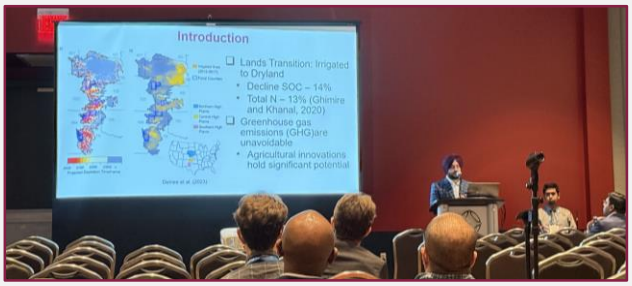
1. Arije et al., 2024. Soil organic carbon recovery and soil health in semi-arid drylands with years of transition to perennial grasses. Journal of Arid Environments.

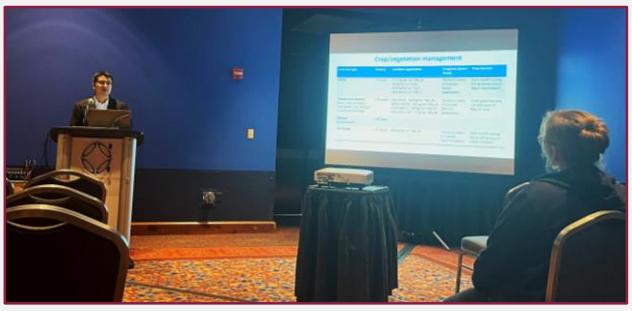
## Well-representation in CANVAS

The American Society of Agronomy, the Crop Science Society of America, and the Soil Science Society of America jointly hosted the annual conference, with the new brand name **CANVAS**, in San Antonio, TX, from November 9–12. In the meeting, researchers and students working on Soil Health and Carbon Management Initiative participated and shared the research findings through oral and poster presentations. At least 10 presentations featured the project.



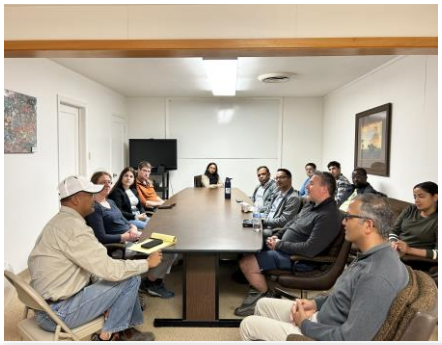

The research topics covered in the presentations included soil health and carbon dynamics with biochar amendments, cover cropping, land use systems, perennial cropping, and circular grass buffer strips.

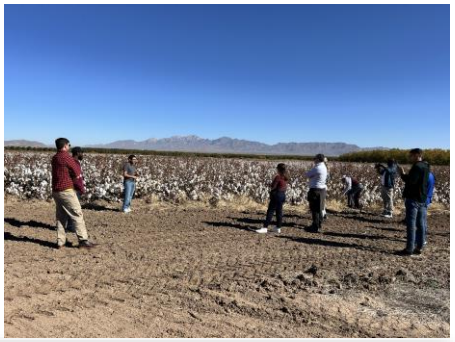


## National and International researchers visited the project demonstration sites

In mid-November, six researchers from Ireland, Northern Ireland, and Morocco, and one of the collaborators from the University of Delaware, visited the research demonstration sites in Clovis and Las Cruces. This visit initiated an exchange of research ideas and strengthened collaboration among experts in soil health and carbon management. It also laid the groundwork for advancing innovative strategies in sustainable agriculture through international partnerships.





## Farewell to student and postdoc researchers

Dr. Pramod Acharya, will be joining the University of Idaho, Department of Plant Sciences in January 2025 as an assistant professor and extension forage agronomist. The position is based in Kimberly Research and Extension Center, Kimberly, ID.

Barsha Sharma, an MS student is graduating in December 2024 and moving to Phoenix, AZ for her new role as a laboratory associate.

Carbon Management and Soil Health Project Team appreciates their contributions to the project and wish them well for the successful career.

**May your holiday season be filled with warmth, love, and laughter, and may the new year, 2025, bring you peace, happiness, and joy!**

**Prepared by**: Pramod Acharya and Rajan Ghimire

**The College of Agricultural, Consumer and Environmental Sciences is an engine for economic and community development in New Mexico, improving the lives of New Mexicans through academic, research, and Extension programs.**