



In this issue

Page 1: Feature Story

Early Seedling Survival is a Key to Increasing Carbon Sequestration During Post-Wildfire Reforestation

Page 2: Publication

Highlights

Mulching for Carbon Storage and Soil Health in Dry Urban Areas

Can Biochar Help Mitigate Climate Change? Our study shows lower greenhouse gas emissions

Page 3: Meetings and

Community Engagement

Carbon Center Showcased Projects at ACES Open House

NSF Project Meeting Highlighted Progress on Biochar Research

Researchers Collaborate to Improve Drought Resilience in Cotton

Page 4: Miscellaneous

Dr. Tamjid Us Sakib Joins Carbon Center to Advance Soil Health Studies

Social Media

Twitter/X: @NMSU_Carbon

Instagram: [nmsu.carbon](https://www.instagram.com/nmsu.carbon)

Feature Story: Early Seedling Survival a Key to Increasing Carbon Sequestration During Post-Wildfire Reforestation

As severe wildfires and climate change continue to reshape forests across the Southwest, researchers from New Mexico State University and the University of New Mexico collaborated to investigate how post-wildfire reforestation efforts can support ecosystem recovery and long-term carbon storage. Dr. Owen Burney and the research team surveyed eight large-scale post-wildfire reforestation sites in the southwestern United States, focusing on operational ponderosa pine plantings. The researchers developed and validated models to estimate seedling carbon storage using both direct seedling measurements and indirect predictors such as years since planting and climate conditions.



Results showed that early seedling survival is the strongest driver of long-term carbon sequestration potential, while future warming, especially at lower-elevation sites, may reduce planting success and carbon storage. These findings support climate-informed planting strategies that improve reforestation outcomes, strengthen carbon benefits, and account for increasing wildfire and climate stress in semi-arid forests. For more details, visit Marsh et al., 2026, <https://doi.org/10.1016/j.foreco.2026.123507>

Publication Highlights

Mulching for Carbon Storage and Soil Health in Dry Urban Areas

Interest in natural climate solutions is growing, and more attention is given to the role of urban soils in storing carbon and improving soil health. Mulching, the practice of covering the soil surface with materials such as wood chips, straw, or rocks, helps conserve soil moisture, regulate soil temperature, and reduce weed growth. A study by Frene et al. (2026) investigated the effects of woodchips and rock mulches on soil carbon storage in the ground under New Mexico olive trees. Results showed that mulching increased soil organic carbon by up to 31% compared to bare soil. Mulching also increased soil moisture by 75-94%, offering an important benefit for tree growth in dry areas. For more details, see Frene et al. (2026)

[Frene et al., 2026. Urban Ecosystems.](#) We also prepared a short video summary of the article, which can be found at <https://www.youtube.com/watch?v=kKekJx9bB40>

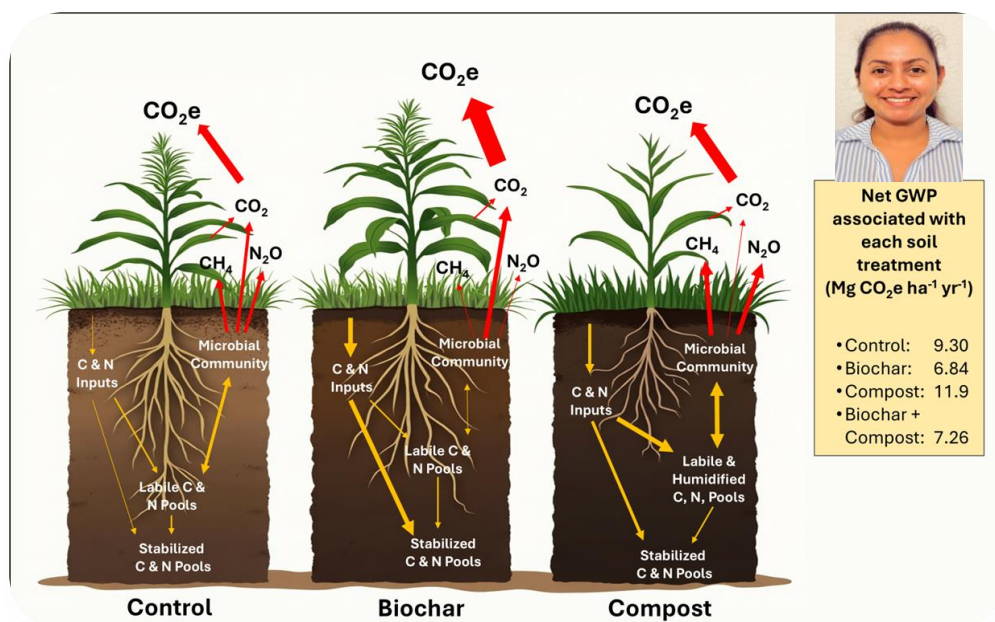
Can Biochar Help Mitigate Climate Change?

Our study shows lower greenhouse gas emissions

Arid and semi-arid regions cover approximately 40% of the U.S. landmass and face growing challenges from soil degradation and climate stress. Using a high-frequency automated monitoring system, researchers at Clovis Science Center found that biochar outperforms compost in climate change mitigation, reducing nitrous oxide emissions by 52% and methane emissions by 16%. Biochar application also lowered net global warming potential by 30–43% compared to control and compost applications. In contrast, compost triggered higher nitrous oxide emission spikes, particularly after wetting events. The application of compost and biochar together minimized gas emissions and improved soil fertility. More details can be found at [Madhuwanthi et al., 2026. Scientific Reports.](#)

Congratulations

Congratulations, Piumi Madhuwanthi, for the Best Paper Award from the Department of Plant and Environmental Sciences and for leading this important research on greenhouse gas mitigation potential of biochar and compost.



Meetings and Community Engagement

Carbon Center Showcased Project Outcomes at the ACES Open House

At the NMSU ACES Open House on April 25th, the Carbon Management Center engaged visitors through poster presentations showcasing its current research portfolio, outreach, and educational activities related to soil health and carbon management. Researchers shared updates on ongoing projects and their relevance to agriculture and environmental management. The event brought together university researchers, community members, and institutional leaders to foster discussions on agricultural research and sustainability.



NSF Project Meeting Highlighted Progress on Biochar Research

Researchers from New Mexico State University, Auburn University, and the University of Delaware met at Auburn University on May 14–15 to review progress on a multi-institution NSF-funded biochar project in its third year. Teams presented findings on biochar production and characterization, and its impacts on soil health, nutrient dynamics, greenhouse gas emissions, and crop productivity in cotton and peanut systems. Participants also toured Auburn University's Biosystems Engineering laboratories and learned about biochar production processes. The meeting strengthened collaboration and advanced climate-smart agriculture efforts across universities.



Researchers Collaborate to Improve Drought Resilience in Cotton

Dr. William Batchelor and a graduate student from Auburn University visited the NMSU Clovis Science Center from March 9-13 as a part of an ongoing collaborative project with Dr. Rajan Ghimire and Dr. Jinfa Zhang on drought resilience in cotton. The visit focused on DSSAT-based crop modeling, where the researchers plan to simulate cotton growth and yield under drought conditions using New Mexico field data to evaluate biochar effects on drought resilience in cotton. Integrating field data with modeling can improve soil management recommendations and identify cotton traits that improve drought resilience. The team also toured ongoing field trials in Clovis focused on soil health and carbon management and discussed further development of collaboration projects.



Dr. Tamjid Us Sakib Joins Carbon Center to Advance Soil Health Studies

The Carbon Management Center welcomes Dr. Tamjid Us Sakib to work on soil health and nutrient cycling projects. Dr. Sakib brings extensive experience in applied soil chemistry, nutrient management, water quality, and cover cropping systems. In his new role, he will contribute to a multilocation Community Solar Project and an NSF-funded biochar project evaluating soil nutrient dynamics, soil health, and carbon sequestration in cotton production systems with biochar and nitrogen fertilizer management.



This Issue Prepared by: Sundar Sapkota (ssapkota@nmsu.edu) and Rajan Ghimire (rghimire@nmsu.edu)

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.