Dryland Soil Sequestration in Southeastern Arizona: Potential and Challenges

Natalie R. Wilson[1]*, Laura M. Norman*[1]*, Joseph Blankinship*[2]*, Samuel Rathke*[2]*, Michele Girard*[3] *and Rattan Lal*[4]

[1]Western Geographic Science Center, US Geological Survey, Tucson, AZ, USA

[2]Department of Environmental Science, College of Agriculture, Life and Environmental Science, University of Arizona, Tucson, AZ, USA

[3]Retired, Coronado National Forest, US Forest Service, Tucson, AZ, USA

[4]CFAES Rattan Lal Center for Carbon Management and Sequestration, Ohio State University, Columbus, OH, USA

Increasing soil carbon storage is part of a suite of approaches to reduce atmospheric carbon stock and address anthropogenic climate change. The soil carbon storage capacity, both organic and inorganic components, of a landscape is a function of ecological, edaphic, climatic, and anthropogenic factors. Landscape degradation is associated with a loss of soil carbon, but ecological restoration, installation of natural infrastructure in dryland streams, and different agricultural practices may reverse that trend. Soil organic carbon storage can be enhanced by increasing biomass in soil and certain agricultural practices. Soil inorganic carbon sequestration includes the formation of secondary carbonates (both pedogenic and biogenic) and leaching of bicarbonates into the sub-soil. Drylands occupy approximately one quarter of the conterminous United States and almost half the global land area and can play an important role in carbon storage, especially here in the southwestern US. Understanding how land management and agricultural practices affect carbon storage in our region can give us insight to global trends. 2023 was the first year of a 5-year study to quantify soil carbon storage at sites across southeastern Arizona, including lands managed by federal agencies, Tribal Nations, non-profit organizations, agriculture corporations, and private citizens. Basic analysis will be performed on individual samples and chemical analysis will be performed on composited samples. We will present the study design, sampling protocols, and the first-year field effort.

Contact Information: Natalie R. Wilson, Western Geographic Science Center, US Geological Survey, 520 N Park Ave, Tucson, AZ, USA 85719, Phone: 520-670-5517, Email: nrwilson@usgs.gov