



Nebraska

Regional objectives: *Precision nitrogen; Nitrogen cycle modeling*

Production system: *Corn-Soybean*

Biochar producers: *TBD – [BioMass Solution LLC](#), [Circularity2](#), and/or others*

University Collaborator: *University of Nebraska*

In Nebraska, water is a limited natural resource highly regulated by the Natural Resources Districts, and nitrogen levels is often elevated in drinking water often exceed the EPA's safe drinking limit. Biochar addition could increase water and nitrogen use efficiency and reduce nitrous oxide (N₂O) emissions, ammonia (NH₃) volatilization, and nitrate (NO₃⁻) leaching. However, adoption of biochar in Nebraska remains low. Thus, we will leverage participating farmers of the Nebraska On-Farm Research Network and the NRCS-USDA-CIG funded "Precision Ag N Project" to demonstrate biochar applications. A third of the trials will be conducted with historically underserved producers, including small and beginning farmers and veterans. Most of the cooperating farmers will use precision agriculture technologies to implement nitrogen applications and yield monitors to collect data. The Nebraska team will advise other regional efforts on precision N trials. Demonstration sites in Nebraska will have at least four nitrogen rates with and without biochar on contrasting soil types within the field. Five metrics, such as soil moisture, soil nitrate, and crop growth (e.g., leaf area index and biomass) will be measured during the growing season. Data collected will be used for crop modeling calibration and estimation of N₂O emissions, NH₃ volatilization, and NO₃⁻ leaching. Results from the demonstration sites in Nebraska will be presented at several meetings and conferences.

N cycling data will be collected and modeled to evaluate NO₃⁻ leaching and N₂O emissions, and effects on economic optimum N rates of biochar application in partnership with [Dr. Guillermo Balboa](#) at the University of Nebraska and [Dr. Laila Puntel](#) at Syngenta, who is also adjunct at University of Nebraska.

Questions? Contact State Leads:



[Guillermo Balboa](#)

AFT Senior Research Fellow | Climate and Soil Health Initiative, National Programs

Research Assistant Professor

University of Nebraska-Lincoln

Agronomy & Horticulture



[Laila Puntel](#)

AFT Senior Research Fellow | Climate and Soil Health Initiative, National Programs, AFT
Fellows Program & University of Nebraska, Lincoln

Computational Agronomy Lead – Syngenta Group