

Research Development Fund – Fall 2023 Application Template

Submission Deadline: **12:00PM CDT Monday – October 23, 2023**, to rdf@tamu.edu

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Application Title: Equipment for the Soil Dynamic Characterization Lab

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Key Participating Units: Hobgood Research Center Soil Characterization Lab; Department of Biological and Agricultural Engineering; Department of Crop and Soil Sciences

RDF Amount Requested (\$): **416,307.00**

Executive Summary

This application requests fundings for new instrumentation to be implemented in the Soil Dynamic Characterization lab to upgrade this facility. The equipment includes fundamentally the TypoSoil apparatus and two related water-soil hydraulic characterization instruments, and complementary equipment. The acquisition will directly benefit three Texas A&M departments: Biological & Agricultural Engineering, Soil and Crop Sciences, and Civil and Environmental Engineering; with the potential to provide information services to the public, government, industry, business in the agriculture, and environmental sectors in Brazos County or around the region. Enhancement of the research infrastructure is not included in this request. Funding this new instrumentation brings significant, strategic information for research and to the academic community of Texas A&M by ensuring advancements on key issues for the State of Texas including drought, irrigation, and water management, as well as innovative solutions to address these challenges.

Dynamics soil characterization throughout the TypoSoil instrument and complementary equipment give an accurate characterization of the water-holding properties of the soil more effectively than conventional methods. It can analyze water retention and shrinking of soil simultaneously simulating real ambient conditions, as no other instrument has performed similarly. Therefore, conductive research using the instrumentation will provide significant supportive information to enhance the state of the art in our understanding of drought, water-soil-crop relationships, irrigation requirements, water use efficiency, nutrients, contaminant transport, and modeling of water movement in the unsaturated soil media. New models are in fact being developed that account for how the soil dynamically evolves in time, changing its structure and its properties in response to changes in environmental conditions, i.e., seasonally, climate change, or management practices. The instrumentation will provide the technical, and scientific support that allows the development of research to experimentally simulate current models (Jha et al., 2023. Braudeau et al., 2018). Consequently, upgrading the Soil Characterization Lab will become a foundational part of the academic community at Texas A&M providing the technical platform for new external funding. In terms of knowledge improvement, anticipated outcomes from research will be the enhancement of the understanding of the effects on soil structure, water holding capacity, irrigation management, and crop yield due to bio-amendment application. In addition, training to faculty, graduate students, and postgraduates for the use of this upgraded facility.