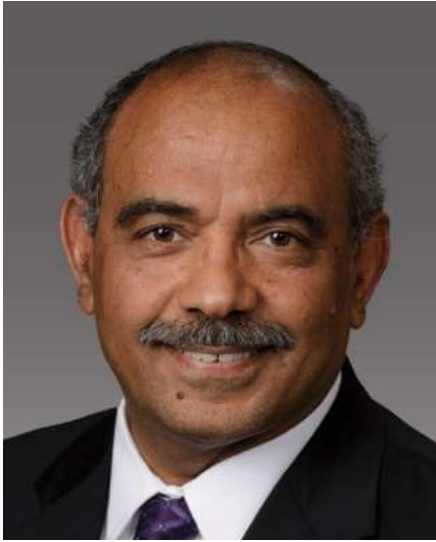# Smart Technologies and Approaches to Ensure Food Security and a Resilient Environment



We are discussing two integrated research projects i) formulating soil amendment practices using smart agriculture technologies and AI/ML approaches; ii) integrated AI-based approach combined with the power of emerging technologies to detect, identify, and quantify various types of crop and ecosystem stresses (four irrigation and nitrogen levels). Field experiments have been conducted to gauge the major environmental and crop response parameters to three organic amendments (biochar, and chicken and dairy manures) and three application rates (low, adequate, and high), irrigation (deficit, adequate, excess) in a sweet corn and sorghum. Measurements of SPAD, LAI, NDVI, RGB imageries, soil moisture, soil water nutrient concentration were collected at different frequencies. Some highlights of the results are: i) crop biomass was not significantly affected by biochar rate while plant height, cob length and diameter, and ear height were significantly affected by manure rate; ii) sweet corn produced tassels and silks earlier in plots treated with chicken than dairy manure; iii) the sugar content was significantly affected by both biochar and manure rate; iv) ANN outperformed the multivariate regression in forecasting biomass production based on SPAD and NDVI data collected; v) the CART algorithm is suitable for identifying the relationship between soil moisture level and $CO_2$ emissions.

**Ali Fares, Ph.D.**
Endowed Professor of Water Security,
Prairie View A&M University

**Date:** Monday, September 28th, 2023
**Time:** 2:00 – 3:00 pm, US Central Time
**Location:** Blocker 220
**Online:** 998 4499 3279 (ID) & 724615 (PWD)
**Faculty host**: Seth Murray, SOSC

## Biography

Fares is an expert in water-energy-food nexus, water security, and climate change. He has mentored tens of students and chaired or served on tens of doctoral and M.S students in multiple international academic institutions. Fares testified before the US-House Agriculture Committee on Climate Issues in 2022 and the Council of State Governments Eastern Regional Conference, East State Legislative in 2021. He is an author of the Fifth National Climate Assessment (NCA5). He chaired the Diversity Catalyst Committee of the Land Grant Institutions Experiment Station Committee on Organization and Policy. He served/is serving on several national working groups, e.g., the National Climate Change, National Initiative of the U.S. Water Security.  Fares is the recipient of several awards, e.g., PVAMU Excellence in Research Award, Irrigation Association; Excellence in Multistate Research. He received + $ 100 million as PI/CoPI. He is the Editor of four books, e.g., Climate Change and Extreme Events. Fares published +130 scientific articles. He is expert witness in West Maui landmark case adjudicated by Hawaii Supreme Court. He is a fellow of the American Society of Agronomy and the Soil Science Society of America.  Fares worked at the University of Hawaii, and in Australia. He received his Ph.D. and M.S. from the University of Florida and his B.S. from Tunisia.

You can also click this link to join the seminar https://tamu.zoom.us/j/97496884861?pwd=Y2ZXRERyMU1EY1A2d2ZNS1JQTDIxdz09.

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