

PROFITABILITY OF ALTERNATIVE NUTRIENT AND IRRIGATION MANAGEMENT SYSTEMS IN CORN, PEANUT, AND CARROT

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Agriculture and nature-based tourism activities are critical for economic development in rural areas, and therefore, agricultural water quality policy should be designed to balance environmental and economic considerations. This study examines the profitability of corn, peanut, and carrot production for three nutrient and irrigation management systems in the Suwannee River Basin, North Florida. Corn and peanut production is a key agricultural land use in the region. Carrot is a new crop being added to the traditional corn-peanut rotation. Such changes can boost farm profitability but also increase nitrate leaching and impact fragile water resources in the region. Nutrient loading can be moderated, however, by adjusting fertilizer application and irrigation. This study examines farm-scale net returns for two crop rotations - traditional corn-peanut vs. modified corn-carrot-peanut. We also consider three management systems that combine alternative fertilizer rates and irrigation scheduling methods to reflect a range of approaches used in the region. Net returns are simulated using the Monte Carlo technique to account for nitrogen fertilizer and crop sales price variability and yield variability. The analysis uses USDA-Agricultural Marketing Services price data, UF/IFAS production budgets, and crop yields data produced by The Soil and Water Assessment Tool (SWAT). SWAT is calibrated to local conditions using carrot production experiments data (2016-2019) and the 30-year historical weather information. We find higher net returns for the modified crop rotation as compared with the traditional corn-peanut rotation. The three irrigation and nutrient management systems result in comparable net returns. Using SWAT estimates of farm-scale nutrient leaching, we illustrate the economic-environmental tradeoffs between profitability and water quality for the combinations of the crop rotations and management systems. This tradeoff analysis can assist the development of agricultural water quality policy and outreach strategies in the study region and beyond.

Acknowledgement: This study is a part of a project “Floridan Aquifer Collaborative Engagement for Sustainability” (FACETS), supported by the National Institute of Food and Agriculture, United States Department of Agriculture, under award number 2017-68007-26319.

PRESENTER BIO: Fei He is a third-year Ph.D. student in Food and Resource Economics Department. For the past five years, she has been contributing to FACETS. As a part of this project, Fei examines the farm-scale and regional economic and environmental outcomes associated with alternative agricultural land uses in North Florida and South Georgia.