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| Project Number:  | 2223R0036 |
| Project Title:  | How does cover crops impact soil water dynamics and soybean production in Louisiana? |
| Organization:  | Louisiana State University-Agricultural Center |
| Project Lead Name: | Xi Zhang |
| Reporting Period:*Please select the appropriate reporting period for this report.* |  [x]  December [ ]  March [ ]  June [ ]  September [ ]  Final |
| The information included in this detailed report should reflect quantifiable results that can be used to evaluate and measure project success.If Progress Report – What key activities were undertaken and what were the key accomplishments during this reporting period? List each key deliverable from the proposal and describe progress made (or not made) toward achieving it, including metrics were appropriate.If Final Report – What were the key accomplishments during the life of the project? List each deliverable from the proposal and describe progress made (or not made) toward achieving it, including metrics where appropriate. |
| The project started on April 1, 2023. In the past quarter (10/2024-12/2024):With intact soil samples taken from control and treatment before the termination of cover crops, we measured soil pore size distribution and saturated hydraulic conductivity. Soil pore size distribution was derived from the wet end of the water retention characteristic, which was measured with the simplified evaporation method. We measured saturated hydraulic conductivity with falling head method based on Darcy’s Law. Soil moisture and temperature data are continuously collected at 15 minutes interval to analyze soil water and thermal status as influenced by cover cropping. We also measured soybean plant height and NDVI to monitor soybean growth.With collected data from control and winter rye treatments, the analysis showed that cover crop effects on soil processes were influenced by soil texture. Cover crop has potential to increase soil structural pores and thus water flux and storage; however, it is significant in surface soil and fine texture soil. For plant growth, compared with no cover crop treatment, soybean planted after winter rye had higher plant height and NDVI value, which indicates cover cropping has potential to enhance soybean growth by improving soil functions. Currently, we are collecting soybean grain yield data.In the winter, we have planted cover crops in late November for next year. Legume and non-legume cover crops (i.e., winter rye, winter peas) and cover crop with taproot (i.e., mustard) were planted in two plots with different soil textures to investigate the influences of different cover crops in diverse soils on water usage during the cover crop growing season and soil water storage, availability, and recharge for the following cash crop.Part of the results have been presented at 2024 American Society of Agronomy (ASA)- Crop Science Society of America (CSSA)- Soil Science Society of America (SSSA) Annual Meeting in San Antonio, TX. |