

Cover Crop Contributions to Ecosystem Services in the Southeastern US: A Comprehensive Assessment of Existing Knowledge and Research Gaps

Cover crops function as service crops within cropping systems, providing a spectrum of agroecosystem services. Among these services are soil and water conservation, mitigation of nitrate leaching, suppression of weed growth, enhancement of soil health, provision of essential nutrients, and the promotion of increased crop yields and stability. Cover crops additionally confer co-benefits in climate change mitigation and adaptation. The extent to which these agroecosystem services are delivered is contingent upon the performance of cover crops, as determined by factors such as biomass quantity and quality. Despite numerous published articles elucidating the effects of cover crops on agroecosystem services, there has been no efforts to systematically compile, integrate, and analyze the findings derived from these studies within the Southeastern United States. Consequently, this systematic review and meta-analysis aim to examine the pivotal role played by cover crops in the Southeastern United States, with a specific emphasis on their influence on soil dynamics and crop productivity. Our primary aim is to create meta-data by aggregating existing cover crop studies, with the intention of comprehensively assessing the present state of scientific knowledge. This endeavor seeks to pinpoint existing gaps in understanding and outline potential avenues for future research in the Southeastern United States. The exploration and evaluation of relevant articles will be conducted by using the ISI Web of Science and Google Scholar databases. Standardized data analysis protocols for meta-analysis will be followed to in the course of this study. This investigation aims to quantify the influence of soil, climate, and management interactions on cover crop performance, elucidating their consequential effects on the provision of agroecosystem services. The results obtained from this study are expected to provide significant insights that can be applied to implement climate-smart agricultural practices within the specified region.