RegenPGC Research

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Towards modeling soil erosion in a perennial ground cover (PGC) system

Abstract: The Perennial Groundcover (PGC) System combines the growth of two plants (main crop and perennial grass) simultaneously, modeling the system is complicated by the fact that most existing models are incapable of modeling two different vegetations at the same time. We initialized and setup Environmental Policy Integrated Climate (EPIC) and Agricultural Production Systems sIMulator (APSIM) for years between 1984 and 2020 to accommodate the long-term effect of planting the PGC systems. We used Nashua, in Floyd County, Iowa, with a latitude of 42.94′ N and a longitude of 92.57′ W, as the study area for this simulation. We conducted preliminary assessment of both model using data from literature and a sensitivity analysis on the input data to better understand its influence on the output results and used the same baseline values for the EPIC and APSIM setup. The critical input data include weather, crop, soil-water, and management practices files. The results from EPIC simulation suggest overall reductions in runoff and soil loss rates of 29 % and 74 % with PGC compared to conventional corn, while APSIM gives 14 % and 66 % reductions, respectively. This is the first attempt at soil erosion modeling within the PGC system. It will provide crucial insights for future modelers, establishing key parameters needed to understand its performance across diverse climatic conditions.

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