EPIC

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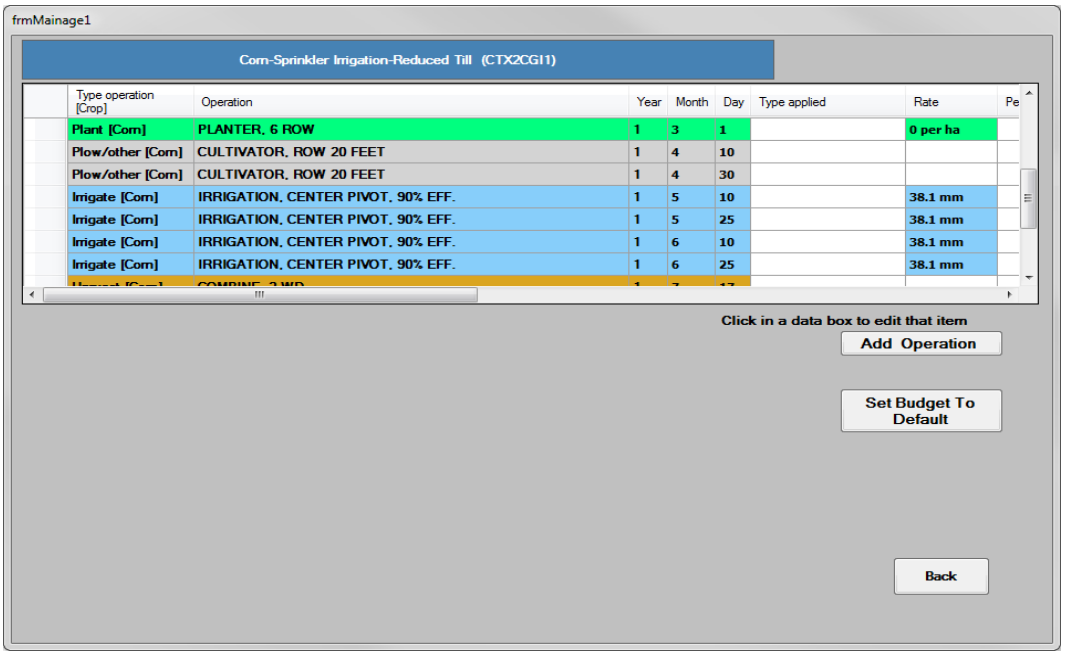
Website

http://epicapex.tamu.edu/epic/

Description

Environmental Policy Integrated Climate (EPIC) model is a process-based computer model that simulates the physico-chemical processes that occur in soil and water under agricultural management. The model can be subdivided into nine separate components defined as weather, hydrology, erosion, nutrients, soil temperature, plant growth, plant environment control, tillage, and economic budgets. It is designed to simulate a field, farm or small watershed that is homogenous with respect to climate, soil, landuse, and topography – termed a hydrologic landuse unit (HLU). The area modeled may be of any size consistent with required HLU resolution. EPIC operates solely in time; there is no explicitly spatial component. It operates on a continuous basis using a daily time step and can perform long-term simulations for hundreds and even thousands of years. Output from the model includes files giving the water, nutrient, and pesticide flux in the HLU at time scales from daily to annual. A wide range of crop rotations and other vegetative systems can be simulated with the generic crop growth routine used in EPIC. The crop growth is simulated depending on the availability of nutrients and water and subject to ambient temperature and sunlight. An extensive array of tillage systems and management practices such as irrigation, drainage, buffer strips, terraces, fertilization, manure management, grazing, and tillage can also be simulated. Soil erosion by water can be simulated with seven different options and five methods are available to simulate potential evapotranspiration (PET).

Screen shots



Scientific articles

Izaurralde, R. C., J. R. Williams, W. B. McGill, N. J. Rosenberg, and M. C. Quiroga Jakas. 2006. Simulating soil C dynamics with EPIC: Model description and testing against long-term data. Ecol. Modelling 192(3-4): 362-384.

Izaurralde, R. C., J. R. Williams, W. M. Post, A. M. Thomson, W. B. McGill, L. B. Owens, and R. Lal. 2007. Long-term modeling of soil C erosion and sequestration at the small watershed scale. Climatic Change 80(1-2): 73-90.

Wang, X., X. He, J. R. Williams, R. C. Izaurralde, and J. D. Atwood. 2005. Sensitivity and uncertainty analyses of crop yields and soil organic carbon simulated with EPIC. Trans. ASAE 48(3): 1041-1054.

Technical information

Operating system(s): Windows, Linux (command-line app, no GUI)

Licence: freely available

Output(s): detailed water balance, sediment, fate and transport of sediment/N/P/C and chemicals, crop growth, soil water content, soil temperature, soil organic carbon pools, net ecosystem exchange

User Manual:

Williams, J. R., S. Dagitz, M. Margre, A. Meinardus, E. Steglich, R. Taylor. 2015. EPIC User's Manual v. 0810. Temple, Tx.: Texas A&M AgriLife Blackland Research and Extension Center. Available at: http://epicapex.tamu.edu/files/2015/10/EPIC.0810-User-Manual-Sept-15.pdf. Accessed 12 November 2015.

Sharpley, A.N., and J.R. Williams, eds. 1990. EPIC--Erosion/Productivity Impact Calculator: 1. Model Documentation. U.S. Department of Agriculture Technical Bulletin No. 1768. 235 pp. Available at: http://epicapex.tamu.edu/files/2015/05/EpicModelDocumentation.pdf. Accessed 12 November 2015.