APSIM (Agricultural Production Systems sIMulator)

Description	APSIM is a modeling framework with the ability to integrate models derived in fragmented research efforts. This enables research from one discipline or domain to be transported to the benefit of some other discipline or domain. It also facilitates comparison of models or submodels on a common platform. This functionality uses a "plug-in-pull-out" approach to APSIM design. The user can configure a model by choosing a set of submodels from a suite of crop, soil, and utility modules. Any logical combination of modules can be simply specified by the user "plugging in" required modules and "pulling out" any modules no longer required. Its crop simulation models share the same modules for the simulation of the soil, water, and nitrogen balances. APSIM can simulate more than 20 crops and forests (e.g., alfalfa, eucalyptus, cowpea, pigeonpea, peanuts, cotton, lupin, maize, wheat, barley, sunflower, sugarcane, chickpea, tomato). APSIM outputs can be used for spatial studies by linking with geographic information systems (GIS).
Appropriate Use	The APSIM environment is an effective tool for analyzing whole-farm systems, including crop and pasture sequences and rotations, and for considering strategic and tactical planning. APSIM allows users to improve understanding of the impact of climate, soil types, and management on crop and pasture production. It is a powerful tool for exploring agronomic adaptations such as changes in planting dates, cultivar types, fertilizer/irrigation management, etc.
Scope	Site-specific but can be extrapolated to national and regional levels using GIS.
Key Output	Changes in crop and pasture yields, yield components, soil erosion losses, for different climate change scenarios.
Key Input	Soil properties, daily climate data, cultivar characteristics, and agronomic management.
Ease of Use	For trained agronomists. Requires advanced knowledge of plant growth and soil processes.
Training Required	APSIM training takes approximately one week to acquire minimum skills to conduct simple simulations.
Training Available	Training courses are offered by APSRU (see Contacts below).
Computer Requirements	Windows-based PC.
Documentation	Available at: http://www.apsim.info/apsim/Documentation/.
Applications	Used in Australia, APN projects in Asia, and AIACC activities in South America.
Contacts for Framework, Documentation, Technical Assistance	Christopher Murphy, APSRU, PO Box 102, Toowoomba, QLD, 4350, Australia; Tel: +61.07.4688.1394; e-mail: Christopher.Murphy@dpi.qld.gov.au; Support desk: http://www.apsim.info/apsim/default.asp.
Cost	Not identified.
References	McCown, R.L., G.L. Hammer, J.N.G. Hargreaves, D.P. Holzworth, and D.M. Freebairn. 1996. APSIM: A novel software system for model development, model testing and simulation in agricultural systems research. *Agricultural Systems* 50:255-271.