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APSIM

Name : Agricultural Production Systems Simulator (APSIM)

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Availability : APSIM software can only be issued to licensed users, but a demo-version can be downloaded from Internet

APSIM is a modeling environment that uses various component modules to simulate cropping systems in the semi-arid tropics. Modules can be biological, environmental, managerial or economic and are linked via the APSIM "engine".

APSIM can simulate the growth and yield of a range of crops in response to a variety of management practices, crop mixtures and rotation sequences, including pastures and livestock. It can do this on the short as well as on the long term, permitting to obtain insight in long-term trends in soil productivity due to fertility depletion and erosion.

It contains modules that permit the simulation of crop - weed interactions, soil organic matter rundown, nutrient leaching, soil erosion, soil structural decline, acidification and soil phosphorus. There is, however, no current capability to deal directly with effects of salinization, insects, diseases or biodiversity loss.

The following crops can be simulated:

Maize	soybean	Chickpea	Lucerne
Sorghum	Barley	Mungbean	Annual medic
Millet	Groundnut	Lupin	Pinus radiata
Wheat	Canola	mucuna	Eucalyptus

sp.

Sugarcane	Cotton	Hemp weeds
Fababean	Cowpea	Sunflower

Data requirements:

1. **Site** : Latitude, soil texture and depth, slope slope length
2. **Climate** : Daily max and min temperature, solar radiation and rainfall
3. **Crop phenology** : Crop type and cultivar, days to flowering, days to maturity
4. **Soil Water, N and P**: soil moisture contents per layer at drained upper limit and lower limit, NO₃-N, soil carbon per layer, total soil N of the top layer, soil bulk density per layer, P-extractable and P-sorption for each layer
5. **Surface residues**: crop and manure type and quantities, C, N and P contents, NH₄- and NO₃-N and available P of manures, percentage groundcover for surface applied materials
6. **Management**: dates of all operations, sowing depth, plant density, type and amount of fertilizer, tillage (type, depth, fraction of above ground materials incorporated)

Reference

McCown, R.L., Hammer, G.L., Hargreaves, J.N.G., Holzworth, D.P. and Freebairn, D.M., 1996. APSIM: A novel software system for model development, model testing, and simulation in agricultural research. *Agricultural Systems* 50, 255-271.