Publications

Book Review: Practical Applications of Agricultural Systems Models to Optimize the Use of Limited Water
by Sally Logsdon, USDA-ARS-NLAE, Ames, IA; sally.logsdon@ars.usda.gov

The book series Advances in Agricultural Systems Modeling attempts to cross disciplines in order to address gaps in our knowledge of processes and their interactions in an agricultural setting. The knowledge developed is then used to address management issues.

The newly released fifth book in the series is titled Practical Applications of Agricultural Systems Models to Optimize the Use of Limited Water. At first, the title would seem to overlap the first book in the series (Ahuja et al., 2008), which discussed various aspects of plant processes under inadequate water both from data and models. However, whereas the first book compared how various models address plant processes, the current book (Ahuja et al., 2014a) describes how models are used as tools for management decisions where water is limiting.

In Ahuja et al. (2014a), six of the chapters use models as tools for irrigation management, such as timing, amount, or water use efficiency or in conjunction with web-based weather-forecasting tools. Some research level models incorporate extensive detail to be used by an adviser or researcher. Others are simplified representatives used directly by a practitioner that are either web-based, a spreadsheet, or an app on a mobile device. Some chapters discuss specific management issues: use of circular planting for efficient water use in dryland agriculture; bioenergy crops; livestock stocking rates; cover crops in olive orchards in relation to water use in dryland agriculture; bioenergy crops; livestock stocking rates in rangeland. The tool was based on results of a more-detailed, calibrated model using stepwise regression, as well as forecast rain. Fang et al. (2014) developed a mobile device app described by Andales et al. (2014) that can be used to aid irrigation management. Fang et al. (2014) expanded the use of web-based weather station networks. p. 53–84.

Key highlights of the book were the comparison of 11 models and how they handled evapotranspiration, soil water, runoff, crop water uptake, plant actual evaporation, and soil hydraulic properties (Ahuja et al., 2014b). Another highlight was the spreadsheet decision-support tool to detect stocking rates in rangeland. The tool was based on results of a more-detailed, calibrated model using stepwise regression, as well as forecast rain. Fang et al. (2014) expanded the use of web-based weather station networks. p. 53–84.

For more, see https://dl.sciencesocieties.org/books/tocs/advancesinagric/practicalapplic. Have an idea for a book you’d like to publish with the Societies? Email Nicole Sandler at nsandler@sciencesocieties.org.

References

Except for Ahuja et al. 2008, all citations below appear in “Practical applications of agricultural systems models to optimize water. Advances in agricultural systems modeling transdisciplinary research, synthesis, and applications. Volume 5. SSSA, Madison, WI.”

Ahuja, L.R., L. Ma, and R.J. Lascano. 2014a. Practical applications of agricultural systems models to optimize water. Advances in agricultural systems modeling transdisciplinary research, synthesis, and applications. Volume 5. SSSA, Madison, WI.

Ahuja, L.R., L. Ma, R.J. Lascano, S.A. Saseendran, and Q. Yu. 2008. Review of agricultural systems models to optimize water. Advances in agricultural systems modeling transdisciplinary research, synthesis, and applications. Volume 1. ASA, CSSA, and SSSA, Madison, WI.