

COTTON2K—MANAGEMENT TOOLS FOR IRRIGATED COTTON**Robert J. Lascano****Jill Booker****USDA-ARS****Lubbock, TX****Don Salisbury****Precept Systems Consulting****Lubbock, TX****J.D. Booker****Texas Tech University****Lubbock, TX****Abstract**

The use of simulation models to manage crops was a concept introduced in the 1980's. For example, the cotton simulation model known as GOSSYM was made available in 1989 and was used by both producers and consultants to manage cotton in real time. More recently, Dr. Avi Marani, Professor Emeritus, School of Agriculture of the Hebrew University of Jerusalem, introduced the cotton model known as Cotton2K. This is a simulation model that was specially adapted for irrigated cotton production in arid regions and thus our interest in its application for the Texas High Plains. The Cotton2K model is based on the GOSSYM-COMAX model and was first tested in California. However, Dr. Marani introduced many changes and the modified model was given the name of CALGOS, short for CALifornia GOSsym and thereafter was renamed Cotton2K. This model is an open source, which means that it can be downloaded, including source code, at no cost to the user, is compatible with current computers on a Windows operating system and is classified as Free Software. Input needed to run the model includes: 1) climatic data (short-wave irradiance, air temperature and humidity, wind speed, and rainfall) on either a daily or hourly time step; 2) initial conditions of soil water content and nitrogen; 3) latitude, longitude and elevation of the simulation site; 4) agricultural management activities (irrigation, tillage, fertilization, growth regulator applications, and defoliation); 5) field data related to row spacing, plant density, and row configuration (e.g., skip rows); and 6) general soil properties related to the soil hydraulic properties. Of interest is input information related to the cotton cultivar, i.e., phenology and morphology, and we are currently in the process of updating these files to include the most popular cotton varieties. The main purpose of Cotton2K is to provide tools to producers, consultants and researchers to manage a cotton crop throughout the growing season in several modes. For example, the model can be used to investigate the response of cotton to different irrigation and nitrogen levels in answering "what if" questions. Cotton2K can be used in a prediction mode to plan irrigation schemes under different weather conditions. In order to facilitate the use and application of Cotton2K by producers and consultants across the cotton Beltwide region of US the original version of Cotton2K was modified as follows. The user now has the option to include calendar date in the chart format (mm-dd-yy) and English units are now the default throughout the program. For example, lint yield is now expressed in lbs/Acre and not in kg/ha, rainfall and irrigation is in inches and not in millimeters, air temperature is in °F and not in °C. These changes were introduced, because they were a source of confusion and in some cases led to errors in calculations. Other changes made to Cotton2K are of a cosmetic nature by redesigning the format of the main user interface. For example, we introduced tab-driven format, increased the use of drop-down menus and enhanced help files and search capabilities that will facilitate the user to take full advantage of the many features provided by Cotton2K. Several users will test the new user interface and their recommended changes will be incorporated. The objective is to provide cotton producers a user-friendly interface to the Cotton2K simulation model.