Cotton2K—Management Tools for Irrigated Cotton

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Cotton2K version 6.2 Modifications

New features include updated appearance and user-friendly functionality (Figures 5 - 8)

- The model now works on 32- or 64-bit Windows systems
- The user has a choice of a cloud- or local PC-based interface with a tab-driven design
- The software is linear, cohesive and intuitive work flow to the model input setup
- It was created using the most advanced technologies including HTML5, CSS3, & Java Script applications to ensure optimum operability on the Cloud
- Optional calendar date in the chart format (mm-dd-yy) in addition to Days after Emergence or Day of Year to add clarity to the output (Figure 9)
- Cotton2K version 6.2 allows for easy selection of default units (English or metric) when inputting the data eliminating a large source of error and frustration from the older version
- Input file formats are the same as earlier versions of Cotton2K so no adjustments are needed to use existing data files

History of Cotton2K

- The use of simulation models to manage crops was a concept introduced in the 1980's
- Dr. Avi Marani, Professor Emeritus, School of Agriculture of the Hebrew University of Jerusalem, introduced the cotton model Cotton2K that is an open source Free Software
  - 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

Input needed to run the model

- Climatic data (short-wave irradiance, air temperature and humidity, wind speed, and rainfall) on either a daily or hourly time step (Figure 1 & 2)
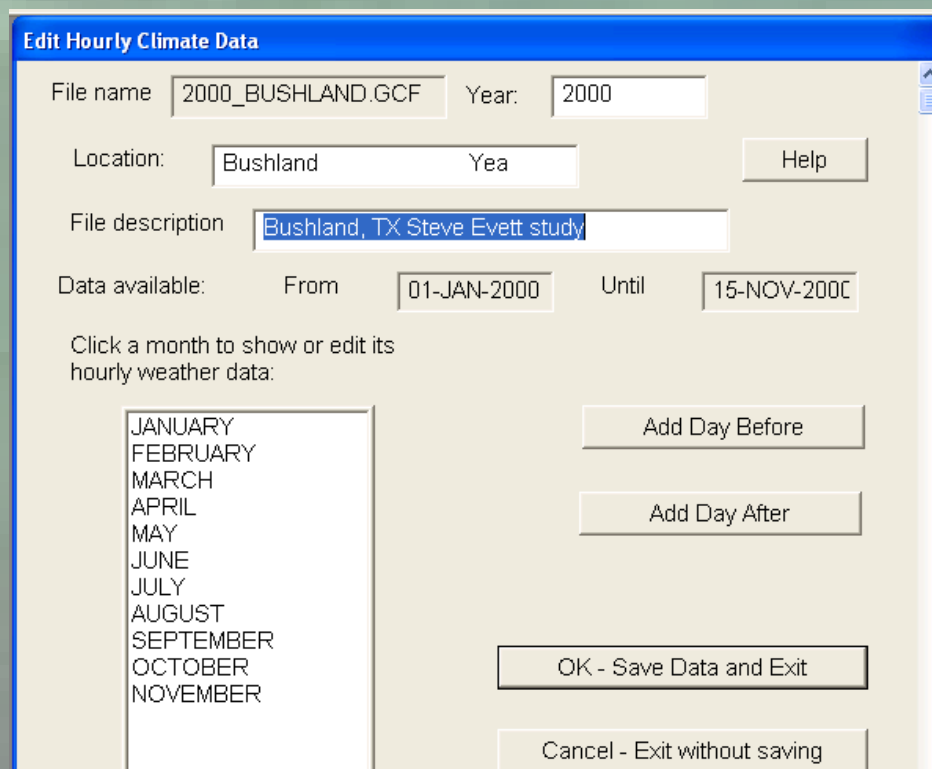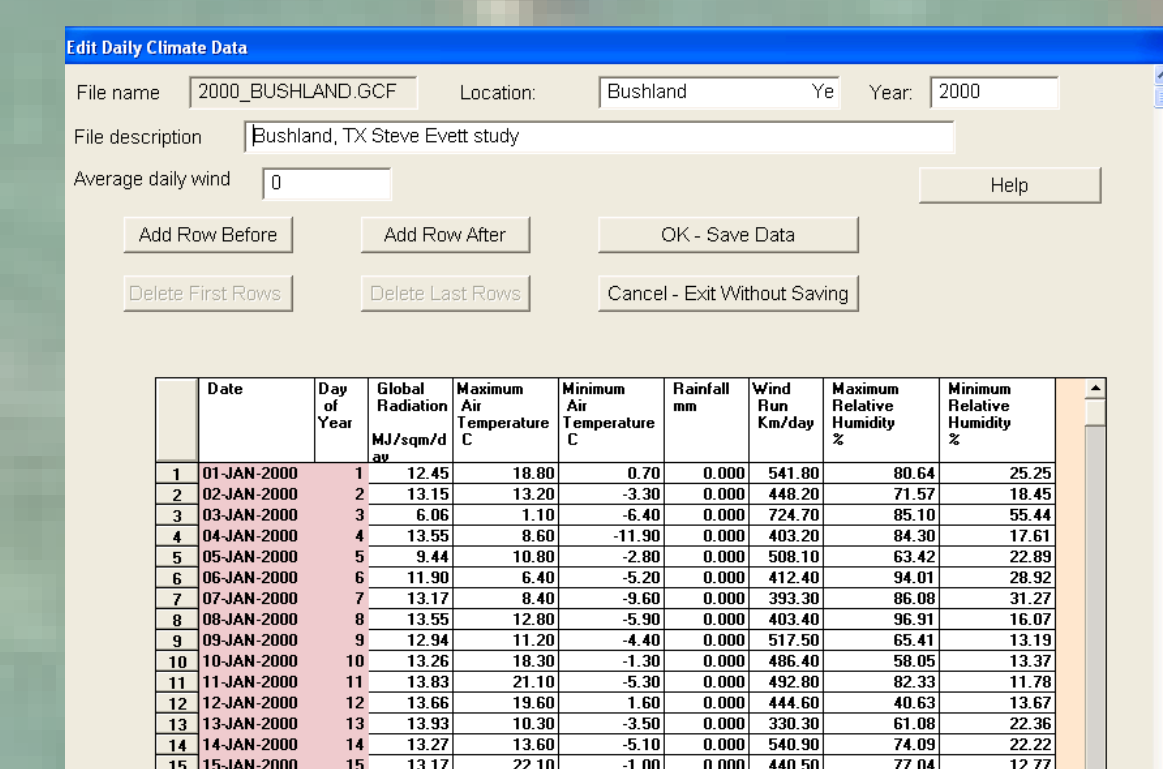

Figure 1. Hourly climate data.

Figure 2. Daily climate data.

- Initial conditions of soil water content and nitrogen (Figure 3)
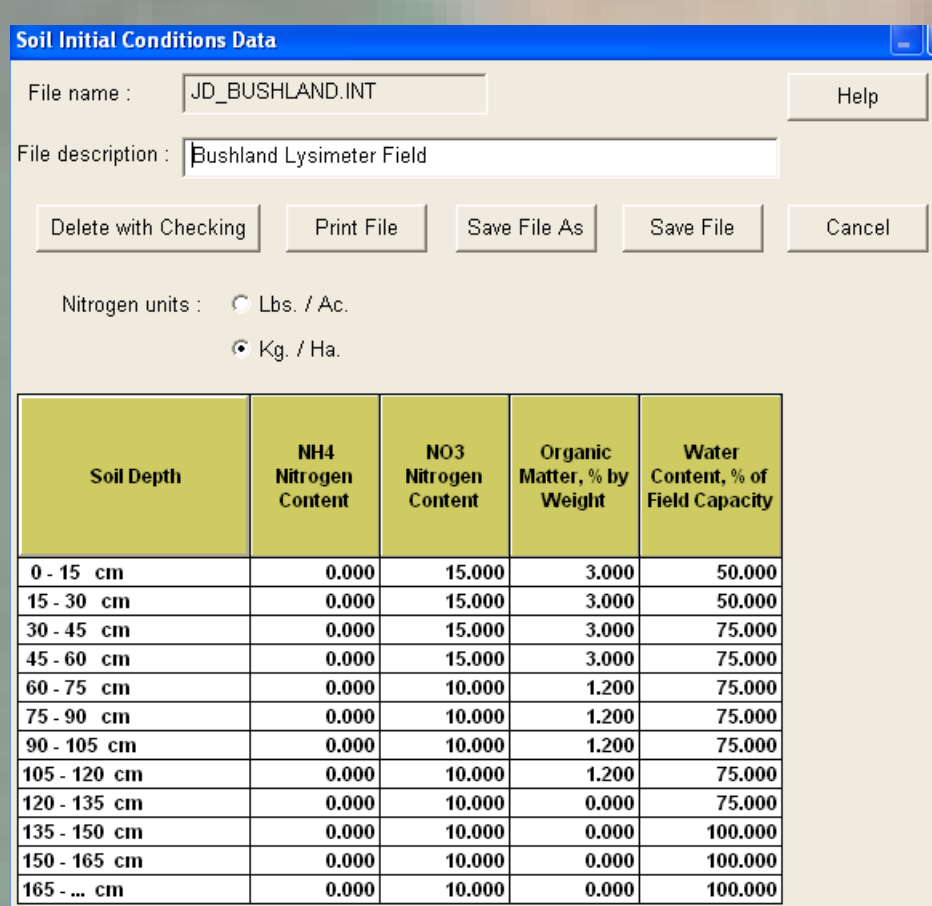- General soil properties related to the soil hydraulic properties (Figure 4)

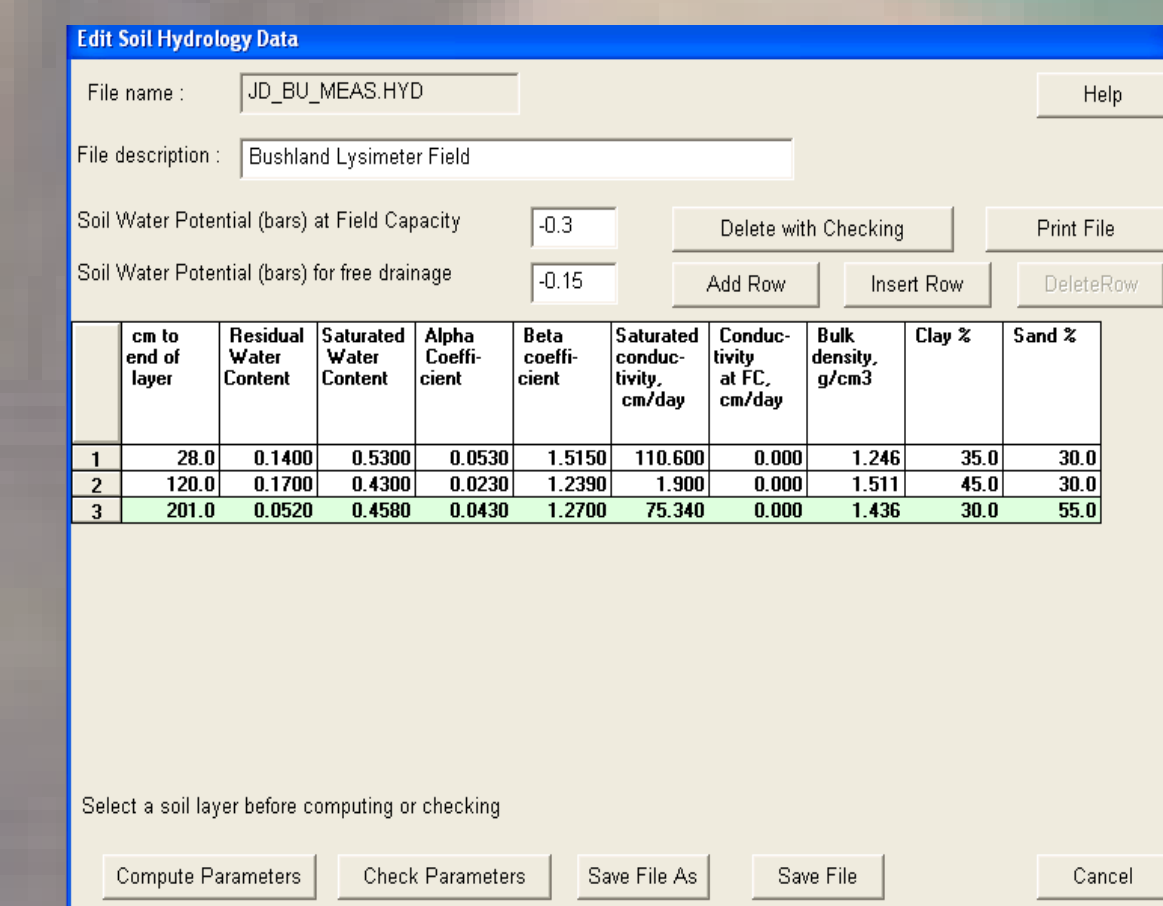Figure 3. Soil initial conditions data.

Figure 4. Soil hydrology data.

- Latitude and longitude, and elevation of the site
- Field data related to row spacing, plant density, and row configuration (e.g., skip rows)
- Agricultural management activities (irrigation, tillage, fertilization, growth regulator applications, and defoliation)

Future Work on Cotton2K

- Incorporate a weather query engine into the new framework to gather current or archived climate data for site-specific modeling
- Update cotton cultivar files, i.e., phenology and morphology, to include the most popular cotton varieties
- Host Cloud-based web version of Cotton2K to facilitate its use by producers and consultants across the cotton Beltwide region of US
- Allow producers and consultants to test the new user interface and incorporate their suggestions
- Develop a "Wizard Driven" graphical interface to query the user for "required" information helping to lead the user through complicated data input
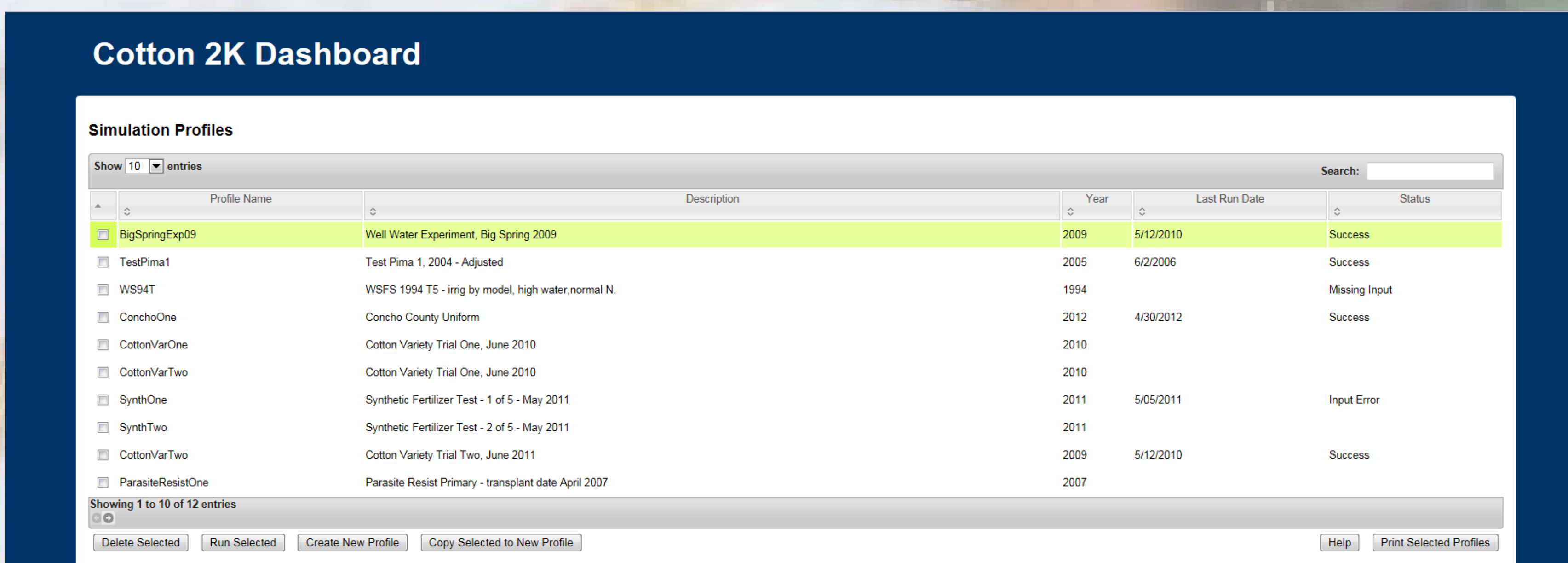

Figure 5. New appearance of Cotton2K version 6.2, which can be deployed on the Web to make use of Cloud-based computing.
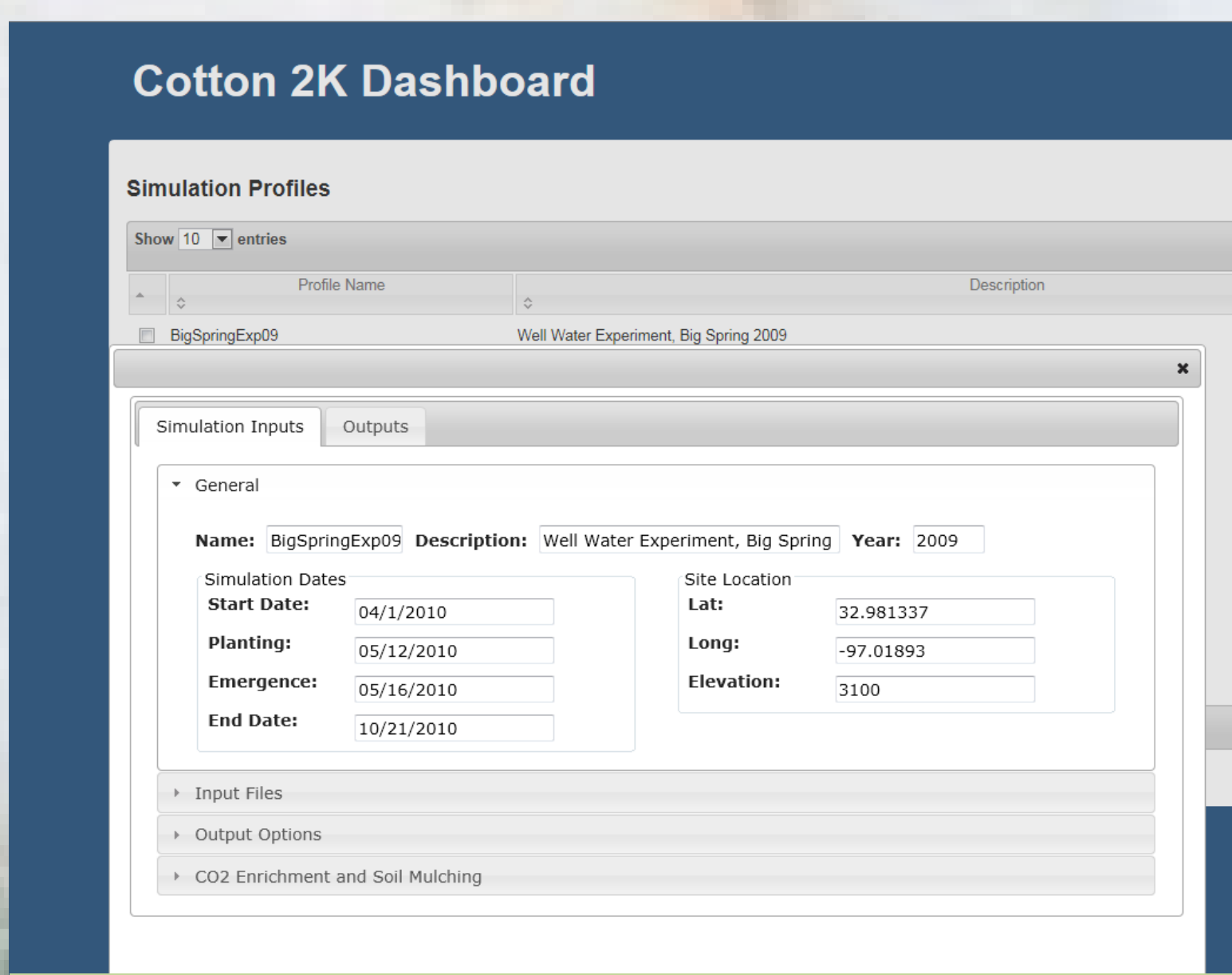

Figure 6. The model is the same, but the interface provides a more streamlined and efficient workflow.
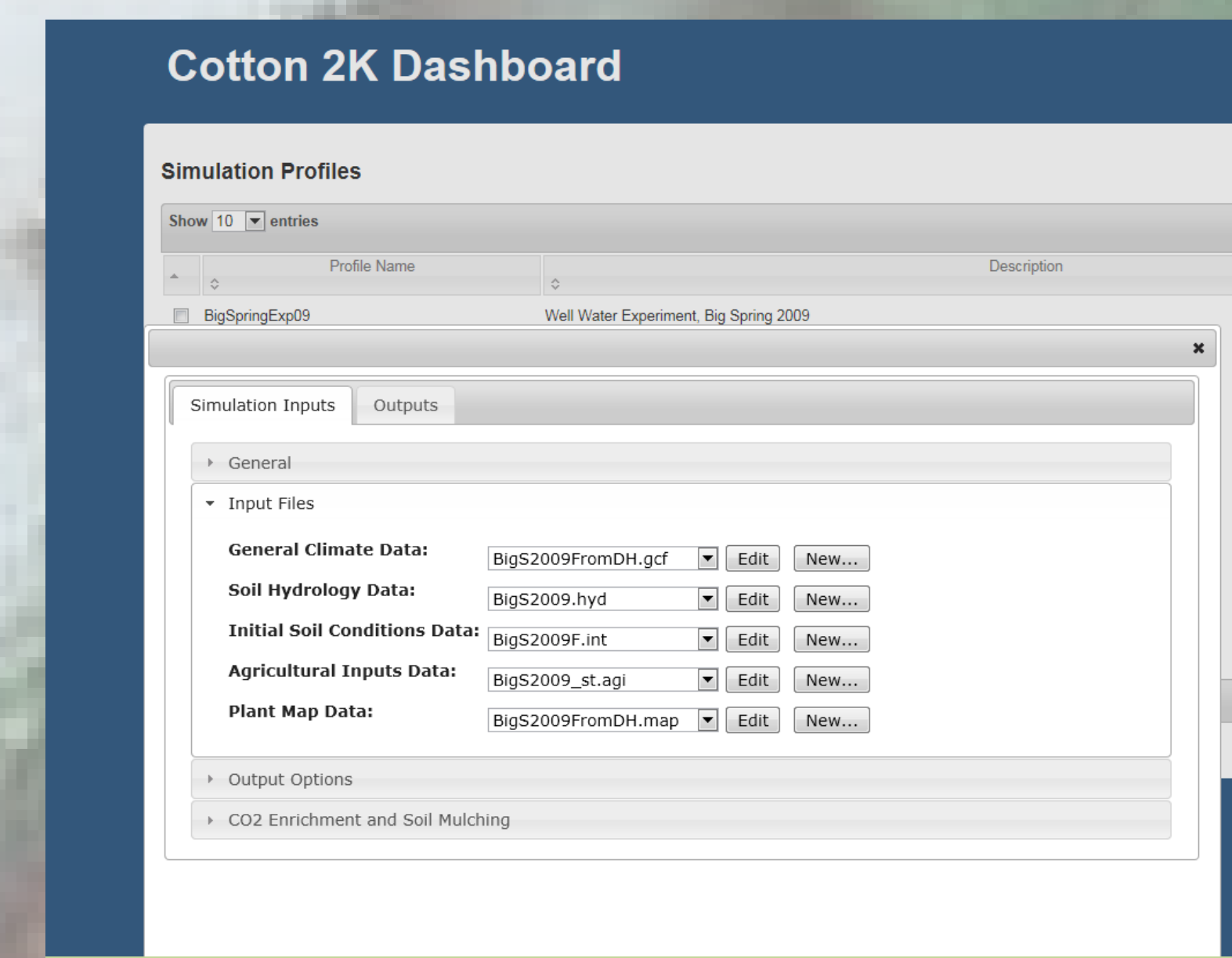

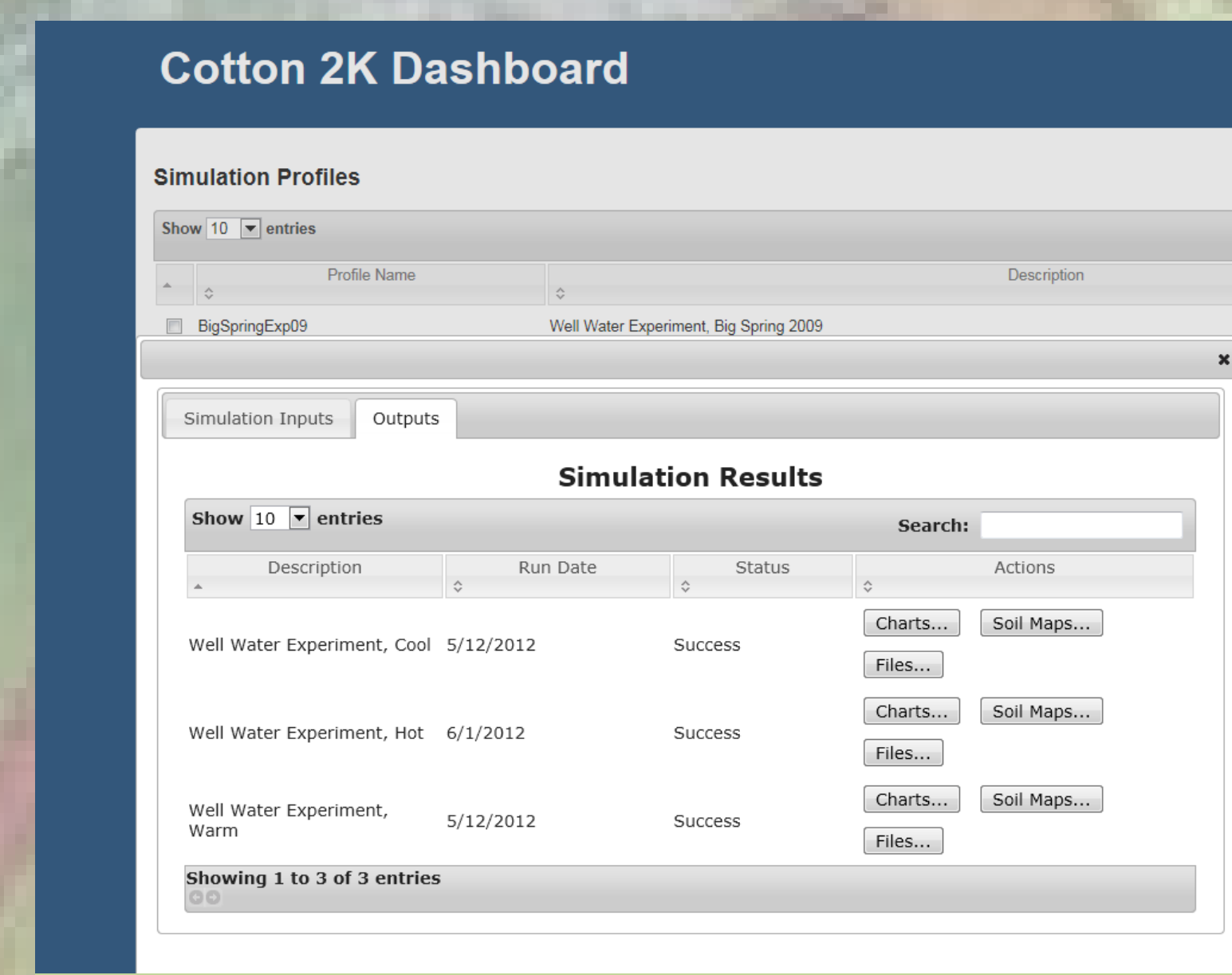Figure 7. Tabs and drop-down menus update the appearance and functionality of the program.

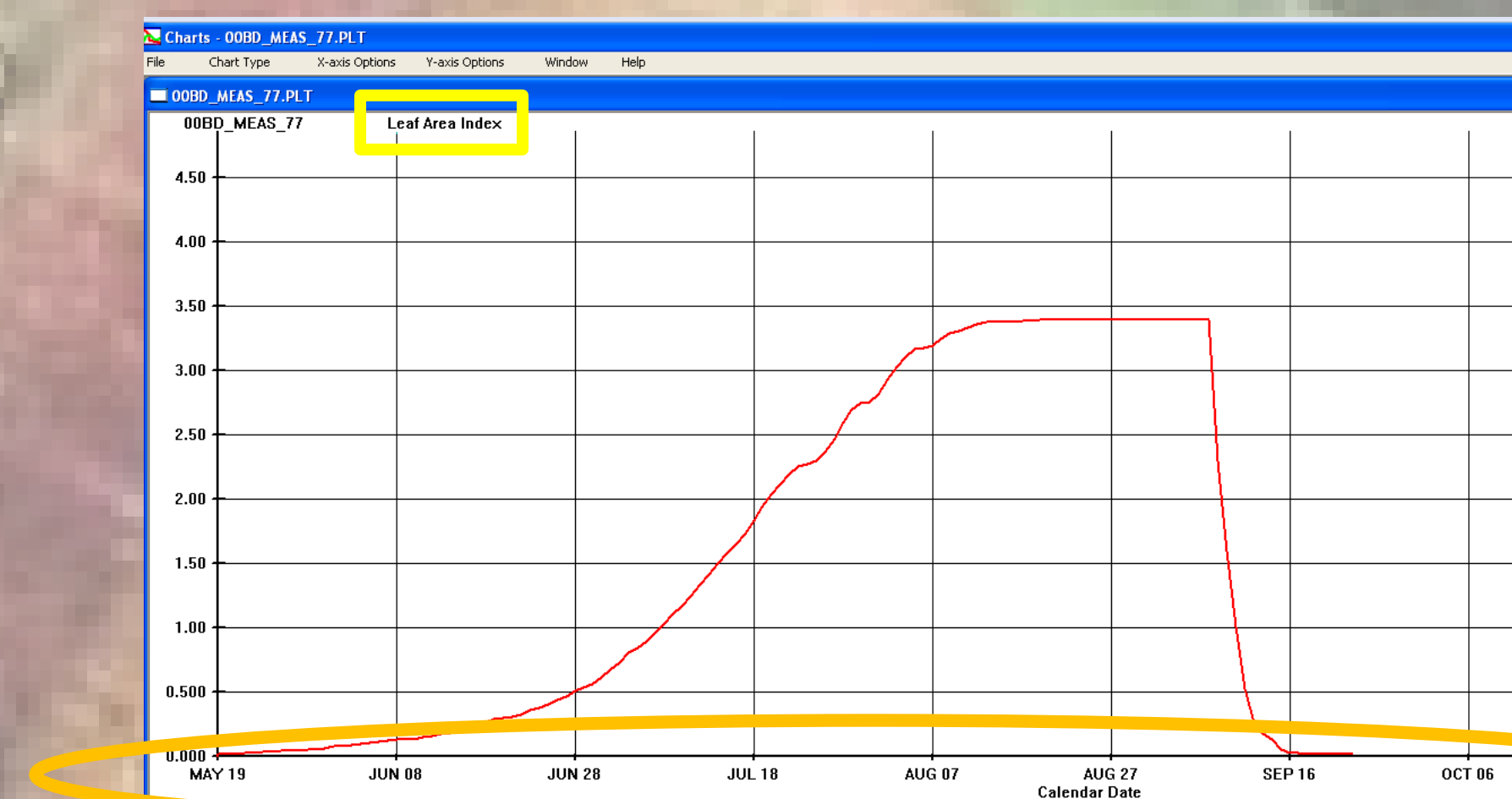Figure 8. Status, date and action fields allow for quick assessment of output information.

Figure 9. Calendar Date has been added as an option for Chart output improving the interpretation of the graphs. This series of charts indicates the various X-axis options now available in Cotton2K.

Uses of Cotton2K

- Provide tools to producers, consultants and researchers to manage a cotton crop throughout the growing season
- To investigate the response of cotton to different irrigation and nitrogen levels in answering what if questions
- Prediction mode to plan irrigation schemes under different weather conditions

We would like to hear from you…
- Suggestions based on previous use of the model
- Ideas about workflow or format improvements
- General model use issues or suggestions