User Guide for ORYZA v3 (Windows edition)

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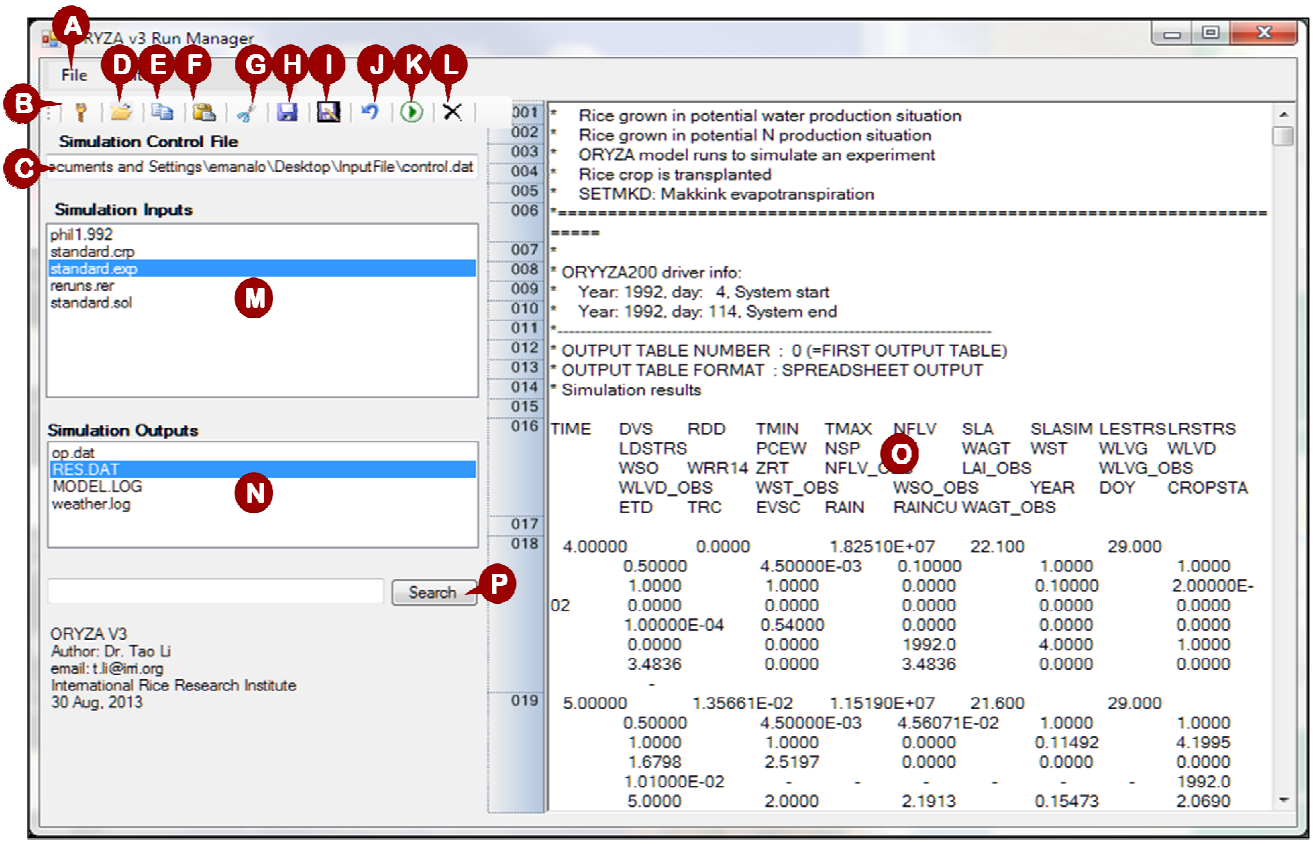
Part 1. Overview of ORYZA v3 Interface for Windows



The ORYZA version 3 Interface for Windows has the following features:

A - ***DROPDOWN*** menu for ***File***, ***Edit***, and ***Execute*** allows for the selection of the following actions:

- ***File Menu*** - Load Inputs, Load Outputs, Save, SaveAs, Clean
- ***Edit* Menu** - Undo, Cut, Copy, Paste
- ***Execute Menu*** - Control File (loads the control file), Run

B - ***LOAD CONTROL FILE*** button allows the user to choose the control file and load it for editing and/or implementing a simulation.

C - ***CONTROL FILE PATH*** textbox indicates the location and name of the control file. Click on this textbox to display and edit the control file in the display window.

D - ***LOAD INPUT FILES*** button allows the user to choose one or more input file(s), other than the control file. View and edit a specific input file in the display window by double clicking it in the selection box.

E - ***COPY*** button creates copies of the highlighted text selection from the display window.

F - ***PASTE*** button places the cut or copied text selection to the preferred destination.

G - ***CUT*** button removes the highlighted text selection from the display window.

H - ***SAVE*** button retains all the changes made in the viewed file.

***NOTE:** To avoid changes in the OP.DAT and RES.DAT output files, **do not use** the save button when viewing these files.*

I - ***SAVEAS*** button enables the user to save the changes using a new filename or a different location.

J - ***UNDO*** button erases the last change done in the file.

K - ***EXECUTE*** button starts the model simulation process as defined by the control file.

L - ***CLEAN*** button removes all loaded and generated files. Use this function to choose a new set of input files needed for another simulation.

M - ***INPUT FILE*** selection box allows selection of input files for viewing and/or editing.

N - ***OUTPUT FILE*** selection box allows selection of the output files for viewing. **Do not** edit/modify items in the output files.

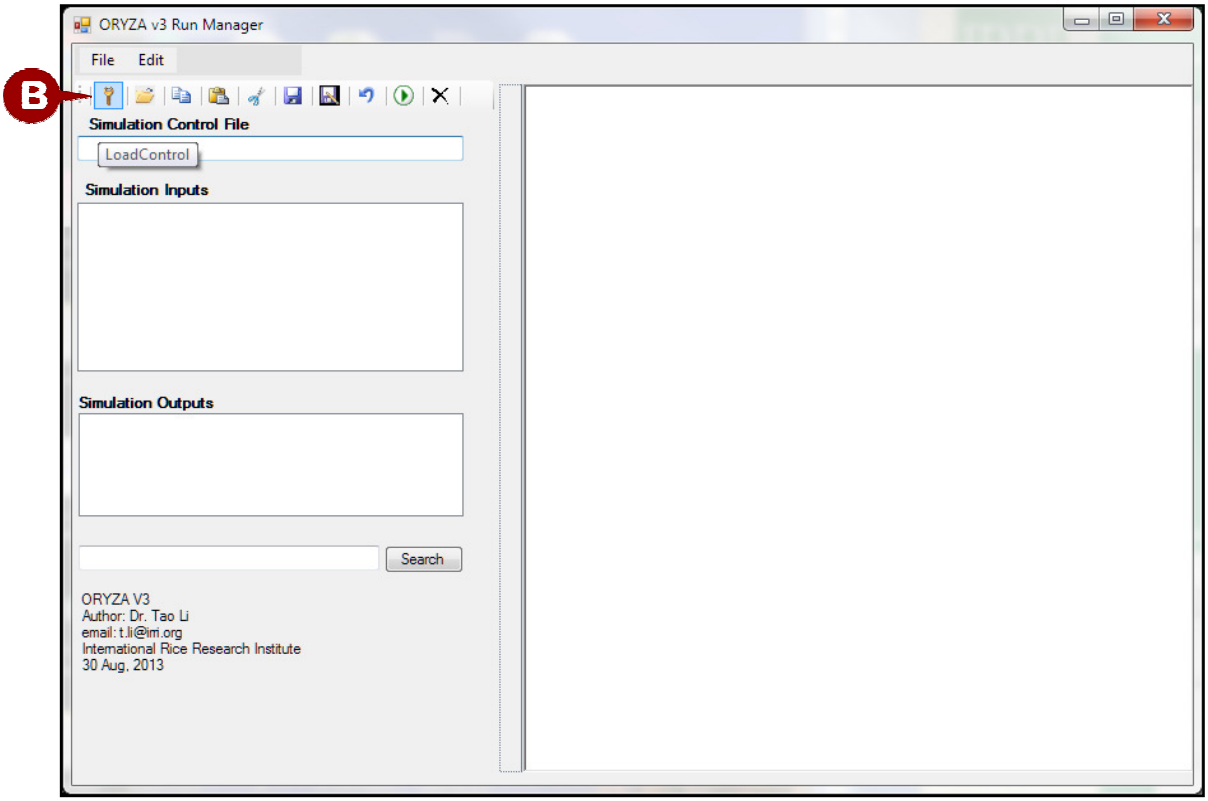
O - ***DISPLAY*** window allows viewing and editing of the selected file.

P - ***SEARCH*** button allows searching for key words in the file. This is case sensitive.

Part 2. Load input files, simulate, and view simulation results

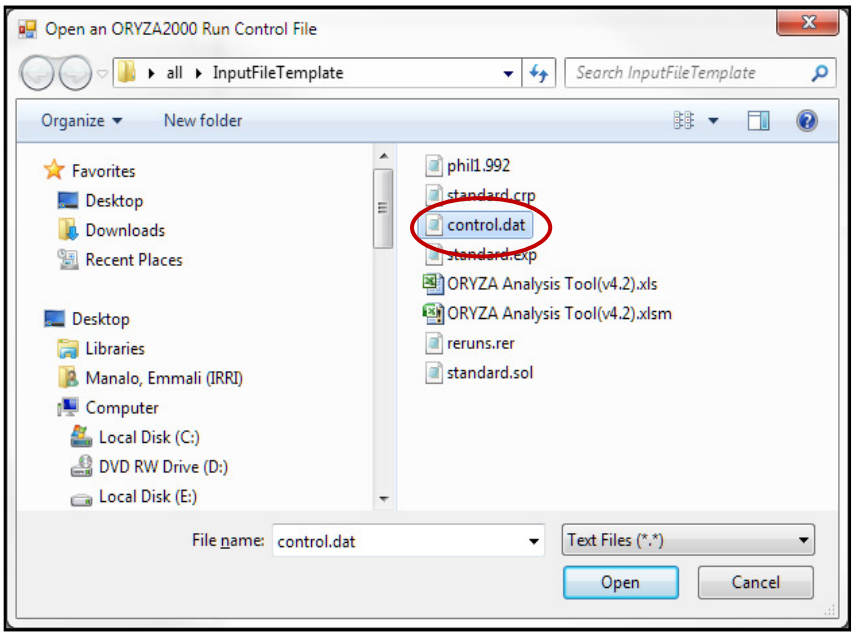
2.1. Load control file

a. Click **Load Run Control (B)** button.



b. Find and select the control file, ***CONTROL.DAT***.

c. Double click the control filename to load.



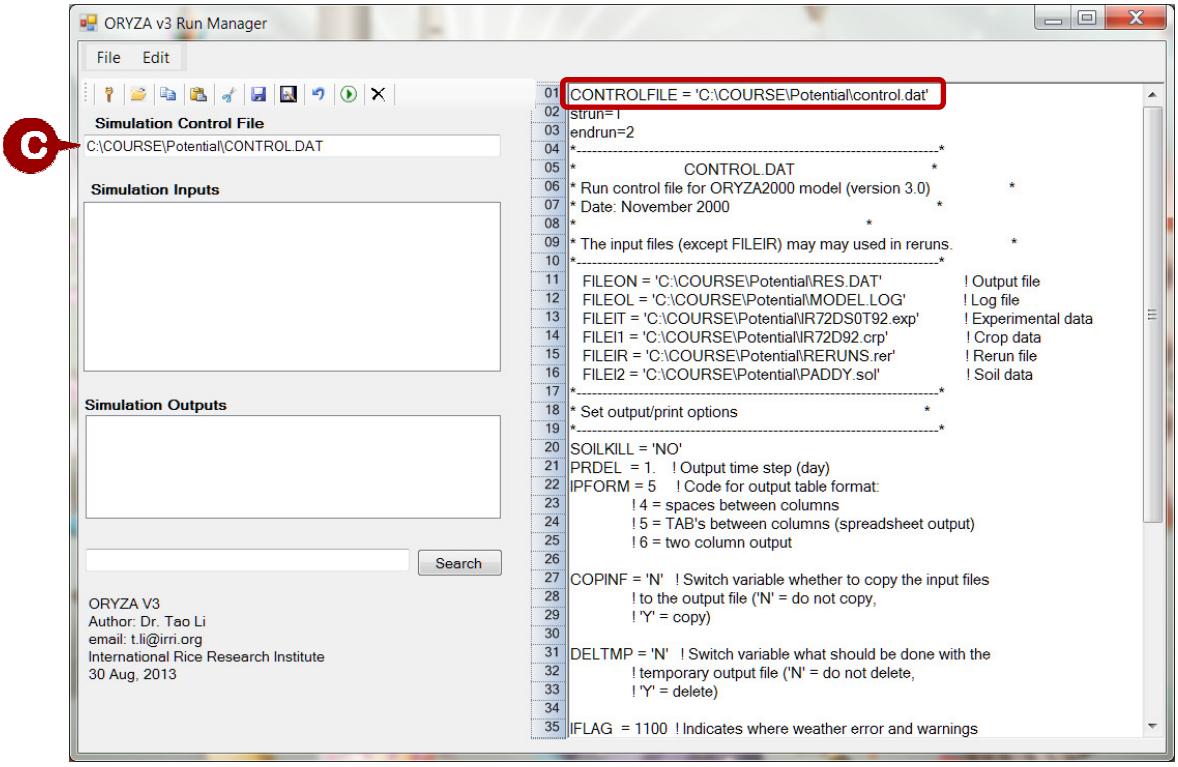
d. To open and view the file, click the ***CONTROL FILE PATH*** **(C)** textbox.

NOTES:

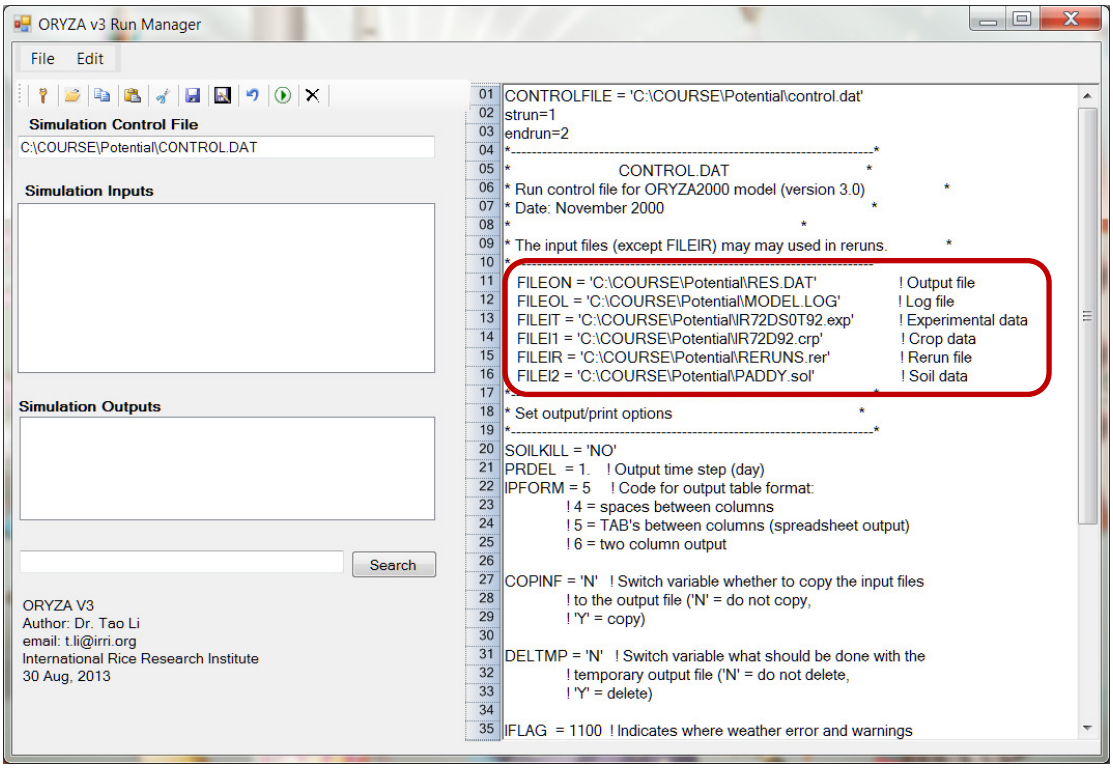
i. The control file is usually named CONTROL.DAT but it can be changed according to the user's preference.

ii. Make sure that the first line of the file reads: **`CONTROLFILE = 'file path/filename' or *CONTROLFILE = file path/filename`**

iii. The control file lists all the data input files that will be used in the simulation.



e. Edit the control file according to the actual file locations and filenames.

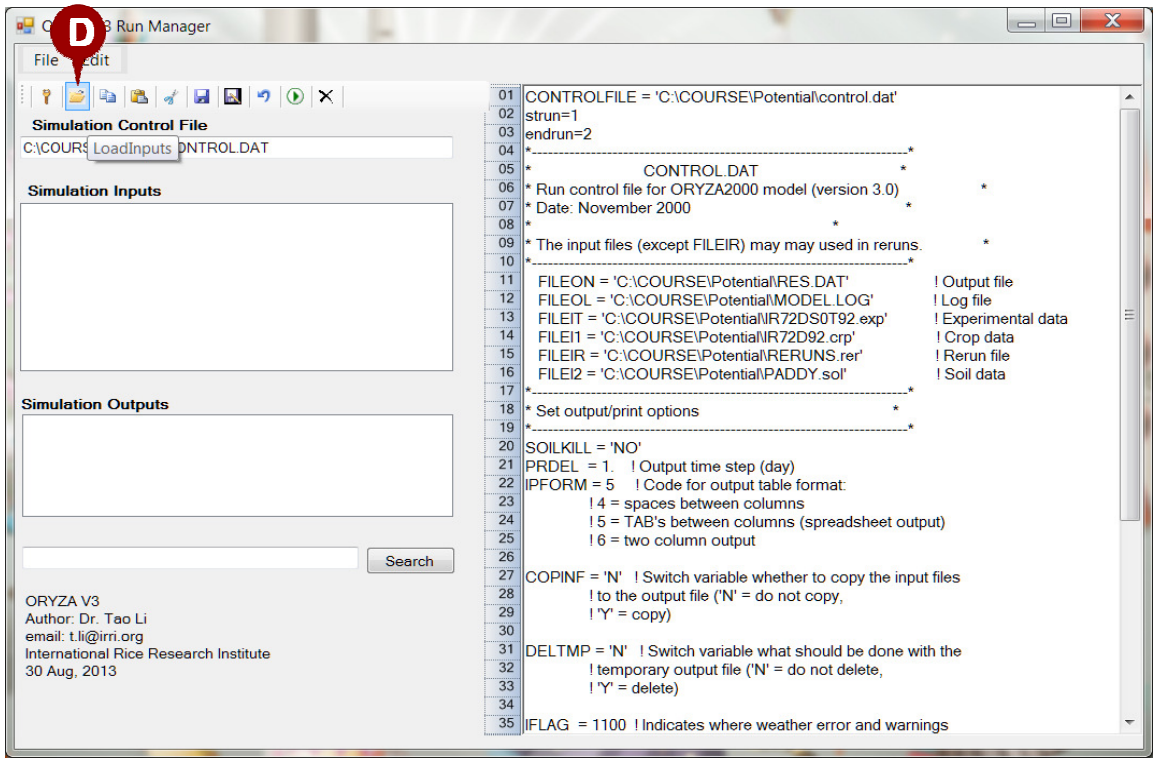


f. Click **Save** to retain the changes in the control file itself. Or, use **SaveAs** to save changes as a new file.

***NOTE:** If the control file was saved using a new filename or location, it should be reloaded via **Load Run Control** button prior to running the simulation.*

2.2. Load input files

a. Click **Load Inputs (D)** button.



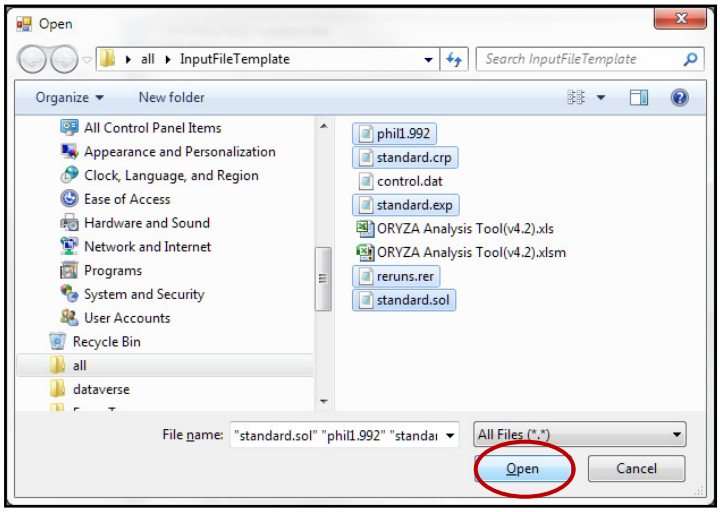
b. Find and select the needed inputs: weather, crop, experimental, and soil files.

NOTE:

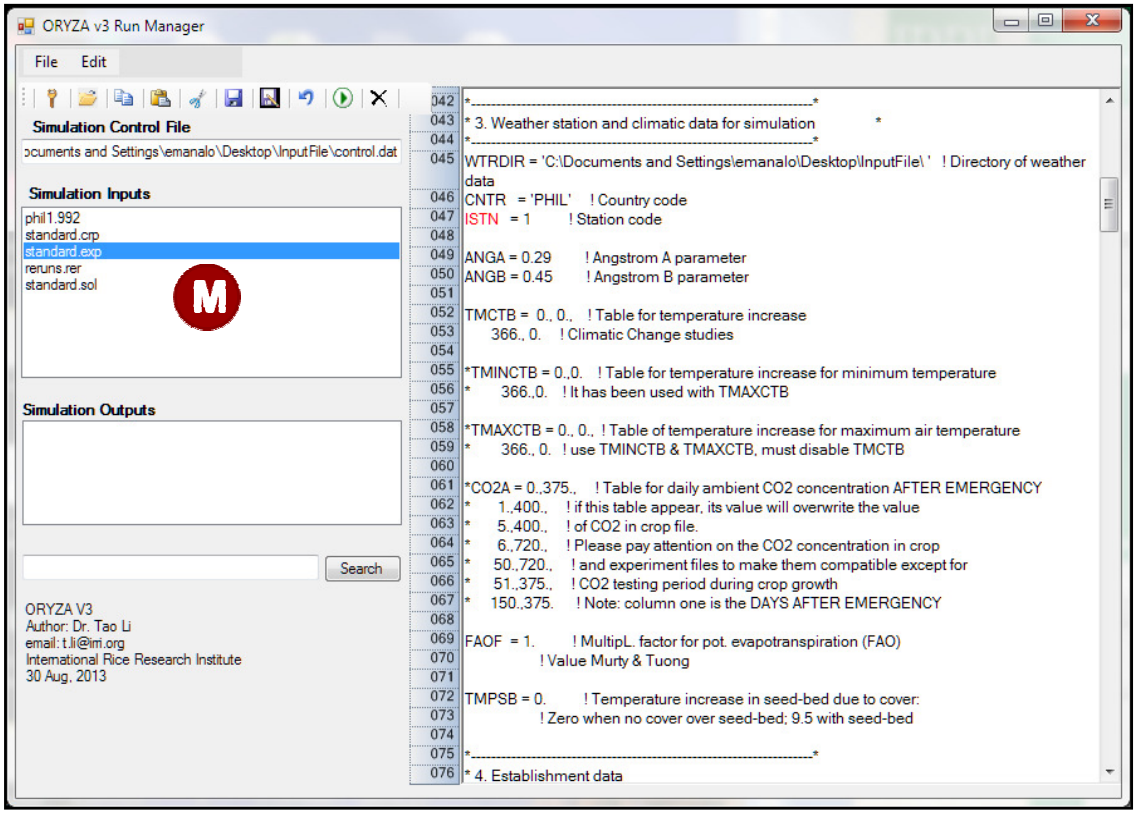
*i. Use **CTRL + <click filename>**, to select and load all input files.*

ii. Load the input file one-by-one, as each file may come from a different location.

c. Then, click **Open**.



d. To open and view an input file, click the filename in the ***INPUT FILE*** **(M)** selection box.



e. Edit the file by modifying the values of the variables, as needed.

f. Click **Save** to retain the changes in the input file. Or, use **SaveAs** to save changes as a new file.

NOTES:

*i. If an input file was saved using a new filename or location, it should be reloaded via **Load Inputs** button, and the control file must be modified accordingly prior to running the simulation.*

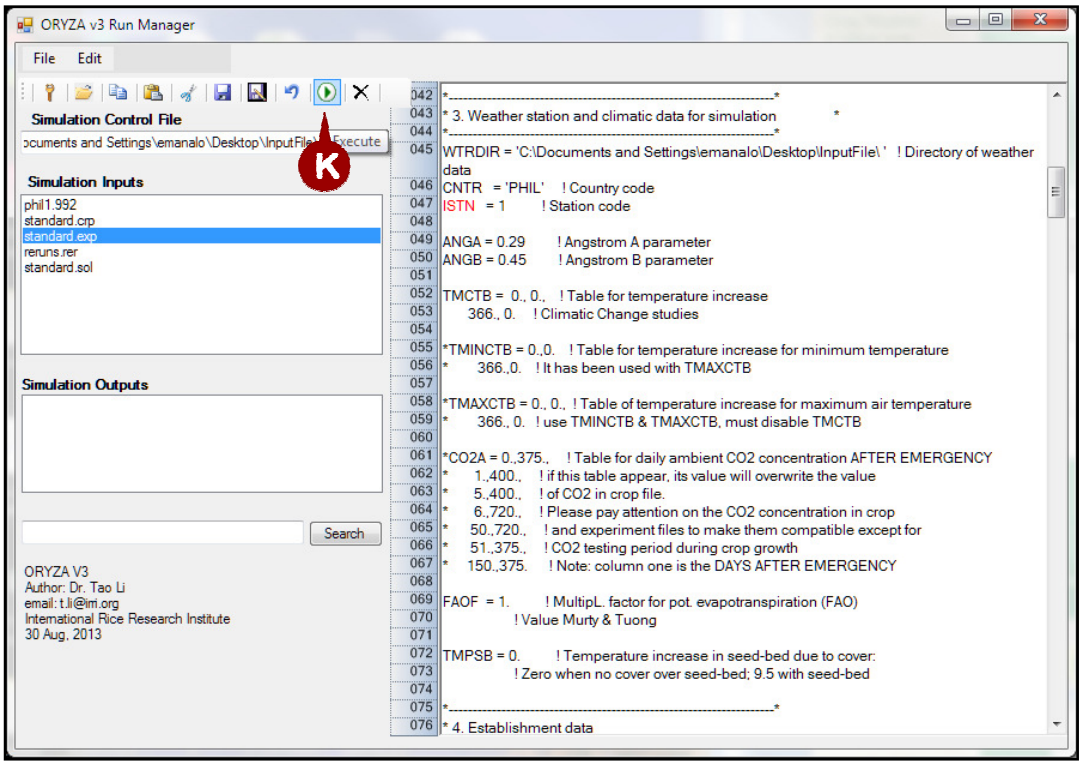
*ii. A loaded input file can be removed from the **INPUT FILE** selection box.*

- *Select the file, then, right click the mouse button.*

2.3. Simulate

a. After loading, double check the control and input files.

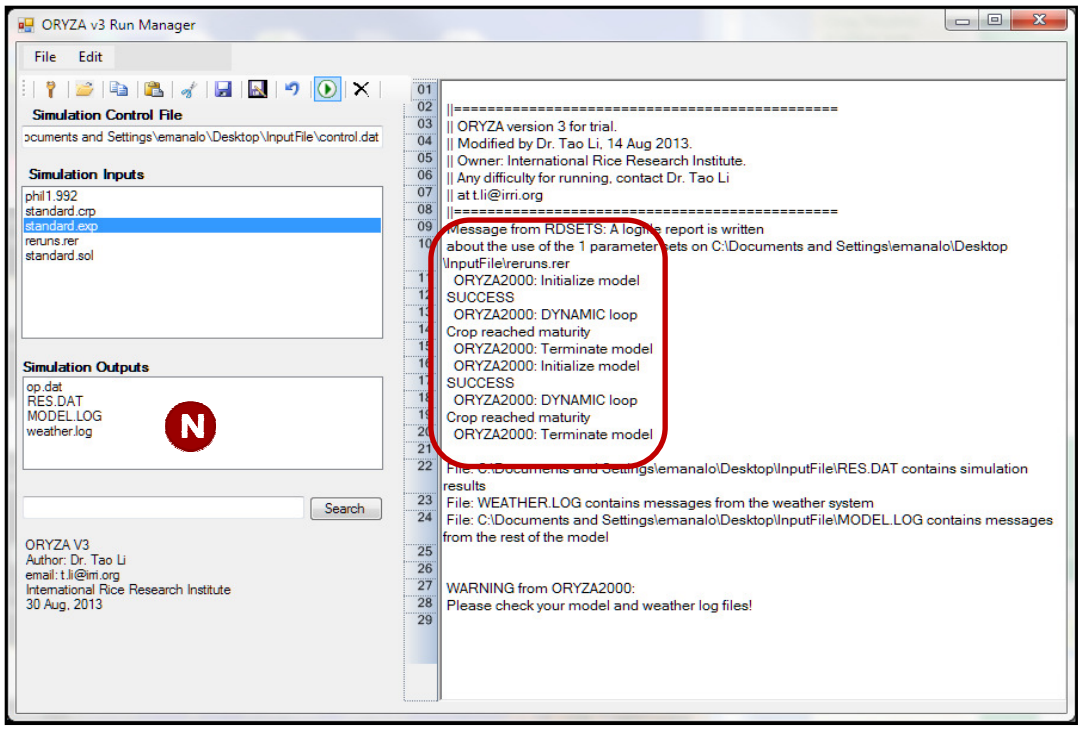
b. Click the **Execute (K)** button to do the simulation.



c. A successful simulation show:

i. The message "***ORYZA2000: Initialize model SUCCESS.***"

ii. The output files in the ***OUTPUT FILE*** **(N)** selection box.

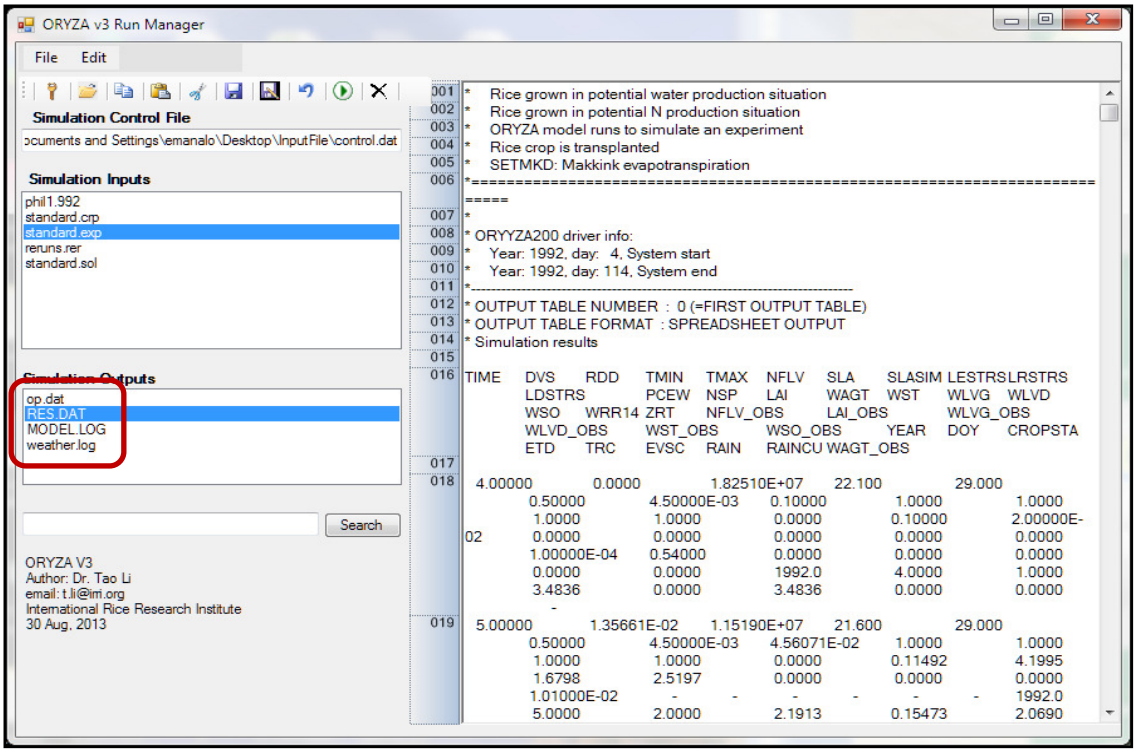


NOTE:

If there is an incorrect setting in the control file, or an invalid value for a parameter in any of the input files, an error message will be generated.

d. The output files include the simulation logs for any warning (and/or errors) and the simulation results, **OP.DAT** and **RES.DAT**.

e. To open and view the simulation results, select between the ***RES.DAT*** and the ***OP.DAT*** files.



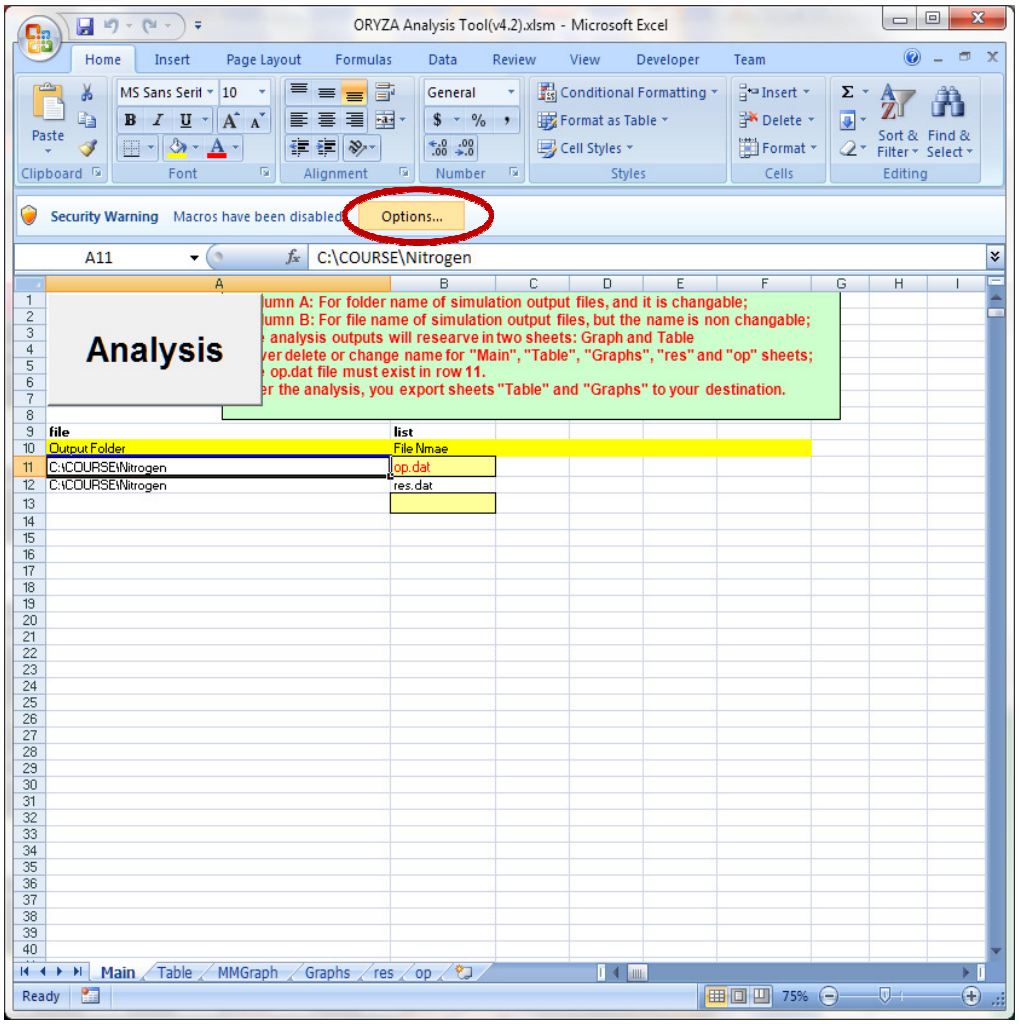
NOTES:

*i. The **RES.DAT** file contains the daily output of the model during the simulation.*

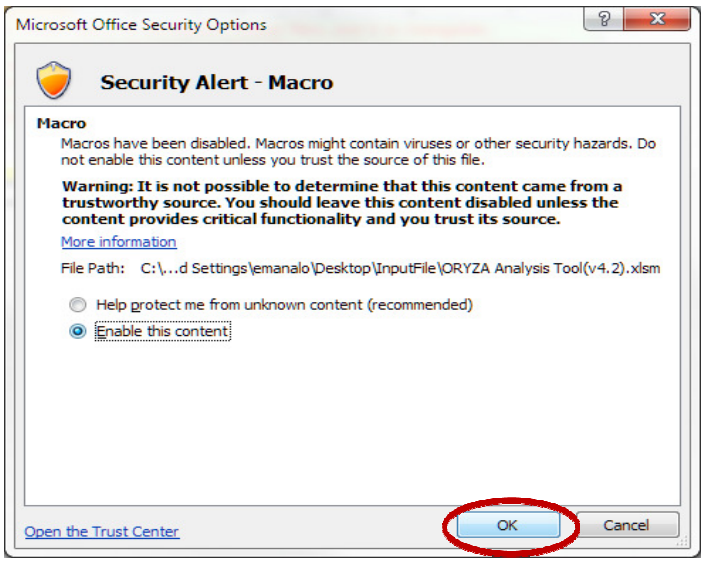
*ii. The **OP.DAT** file also contains printed variable values, but only the summarized seasonal results. For example, final yield, total crop duration, and seasonal transpiration and evaporation.*

2.4. View simulation results using ORYZA Analysis Tool

a. Open the **ORYZA Analysis Tool**.

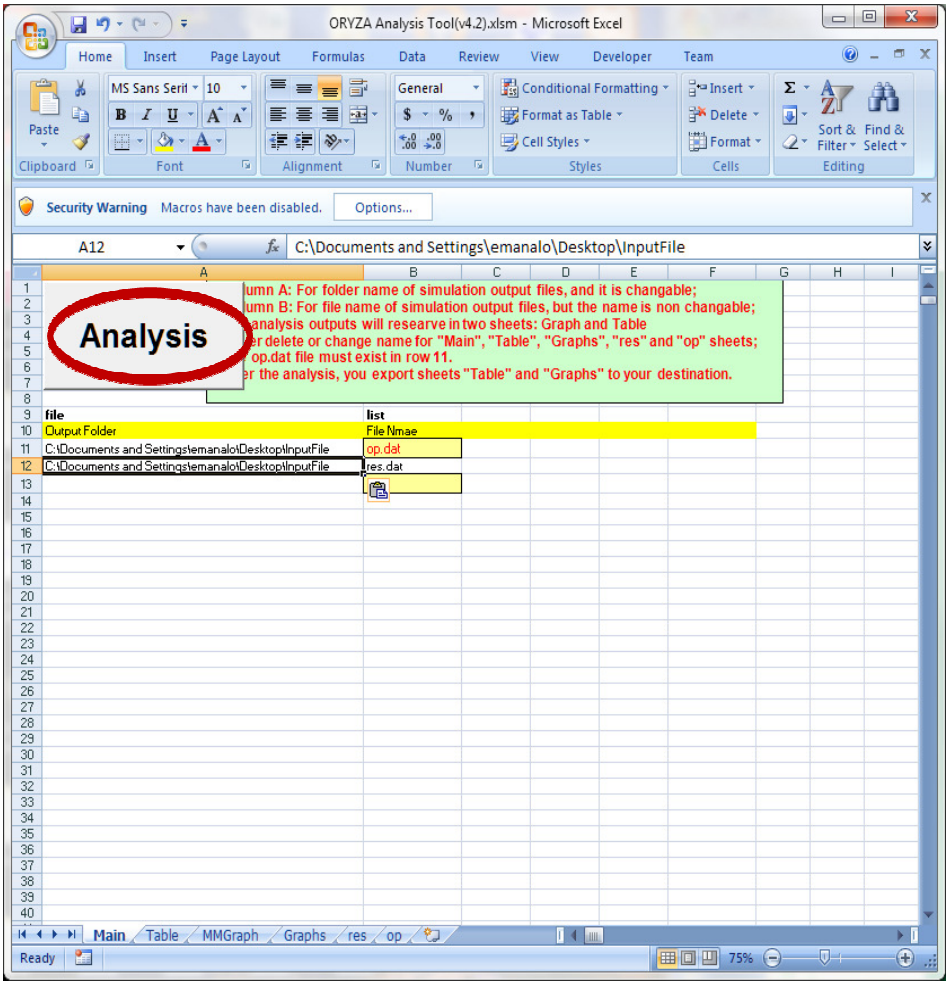


b. Click on the **OPTIONS…** button, then tick the 'Enabled the content' option on the Security Alert-Macro.

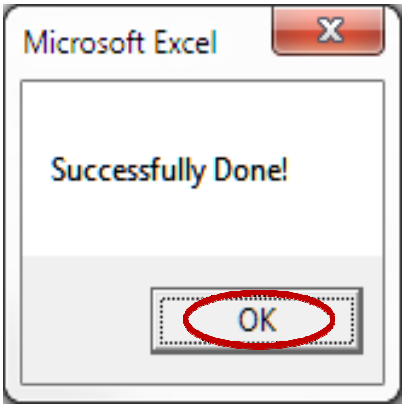


c. Make a link to the target simulation output by changing the output folders.

d. Click **ANALYSIS** button.



e. A message showing **"*Successfully Done!*"** appears.

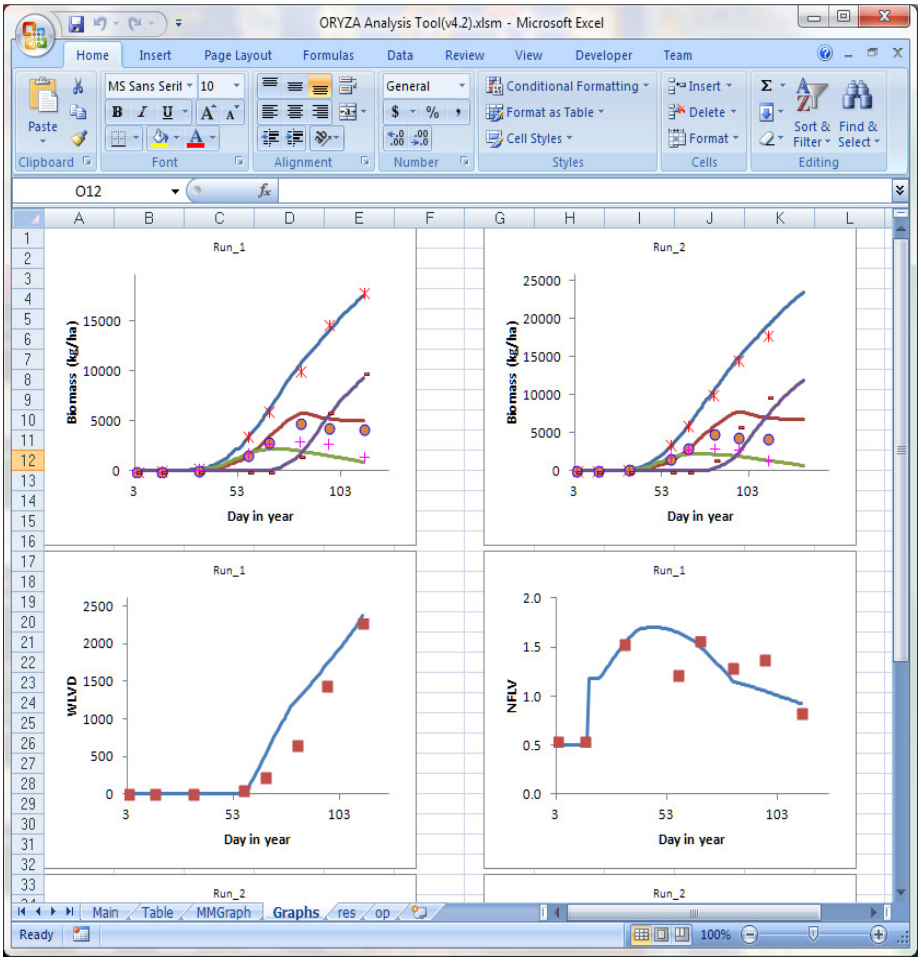


f. The statistical analysis results and graphs can be found in the '**Graphs**' and '**Table**' worksheets, respectively.

g. The seasonal and detailed outputs per time step are reorganized into '**op**' and '**res**' worksheets, respectively.

NOTE:

*Use '**ORYZA Analysis Tool(v4.2).xlsm**' for MS Excel 2007 or higher; or*
*'**ORYZA Analysis Tool(v4.2).xls**' for versions earlier than MS Excel 2007.*



Part 3: Preparation of Input files

Input file templates include *.exp for experiment file, *.crp for crop file, *.sol for soil file, control.dat for simulation control file and reruns.rer for rerun file. The easiest way to prepare input file for user's simulation is to use the template file to make the necessary changes and save it as a new file.

3.1. Experiment, crop, and soil files

a. Open the needed template file.
b. Modify the values of variables as needed.
c. Save the modified file to a target folder with the preferred file name.

3.2. Rerun file

a. Open rerun file template.
b. Include and list down the files and/or variables that need to be simulated to replace previous content of the template.
c. Change values of variable as needed.
d. Each rerun will be composed of a set of input files and/or variables modified by the user.
e. Copy the first rerun set and change values of variable to format a new rerun set. Repeat step ***e*** to make additional rerun sets as needed.
f. Save it to the target folder with the preferred file name.

***NOTE**: All rerun sets should contain the same input files and/or variables (with changed values) and should be in the same order.*

3.3. Simulation control file

a. Open control file template.
b. Change the "CONTROLFILE =" path according to the corresponding work folder and control file name.
c. Change the folder and file names for all input files to corresponding modifications in steps ***3.1*** and ***3.2***.
d. Save it to the folder with the file name as indicated in the first line (CONTROLFILE =) of the modified control file

***NOTE:** Always make sure that the first line is set correctly.*

```
CONTROLFILE = '<file path/control file name>'
```

OR

```
*CONTROLFILE = file path/filename
```

3.4. Weather files

a. Use a spreadsheet to initially organize a weather data file. Each weather file is composed of one year daily data.
b. Adjust the order of different variables into columns in this particular order:
   i. station number,
   ii. year,
   iii. day,
   iv. radiation,
   v. min temperature,
   vi. max temperature,
   vii. vapor pressure,
   viii. wind speed, and
   ix. precipitation
c. Insert one row as the first row of data, and type in the longitude, latitude, altitude, Angstrom A and B parameter. Angstrom A and B is ***0*** if you have radiation data; otherwise, provide values if the data contains sunshine hours;
d. Save each sheet in comma delimited file (.csv) format with name "***station name+station number***", in which the station number must be the same as in the first column of the file.
e. Change the extension of file from '.csv' into the '***last three digit of data year'***, for example, '.999' and '.000' for weather data in year 1999 and 2000, respectively.

Part 4. Parameterization

4.1. Crop parameterization

4.1.1. Preparation of parameterization control file

Prepare the crop, experiment and weather files as described in the steps earlier. Refer to Appendix 7 of Training Handouts for the templates of the input files needed for **'DRATE.EXE'** and '**PARAM.EXE'**.

a. Open the template file '***PARAM.IN'***, which is similar to the control file.
b. Modify input and output folder file path and names accordingly.
c. Save it to the folder with the correct file name and file path in the first line of PARAM.IN.

****NOTE:** Make sure that the identifying line, at the first column and first line of the file, is in the proper format:*

```
PARAMFILE = '<file path/parameterization control file name>'
```

4.1.2. Determination of phenology development rates

The application, '**DRATE.EXE'**, is used to determine the phenology development rate of a given variety.

Prerequisites:

a. Supply correct phenological stages in section 8 of experimental file (see Appendix 1 in Training Handouts)
b. Crop and weather files.

Steps:

a. Make sure to include a copy of the application, '***drate1.exe'***, to the folder with parameterization control file.
b. Double click the application.
c. Type in the file name of parameterization control file when the DOS prompt appears.
d. Open the ***drate.out***.
e. Use the values of ***DVRI, DVRI, DVRP,*** and ***DVRR*** from ***drate.out*** for the crop file that you are calibrating.

4.1.3. Determination of other crop parameters

The application, '**PARAM.EXE'**, is used to estimate crop parameters such as, assimilate partitioning, specific leaf area, non-structure C&N translocation, etc.

Prerequisites:

a. The sequential observations in section 8 of the experimental file (see Appendix 1 in Training Handouts):
    i. Total above-ground biomass,
    ii. Green and dead leaf biomass,
    iii. Stem biomass,
    iv. Panicle biomass,
    v. Leaf area index, and
    vi. Leaf nitrogen content (if applicable)
b. The measurements for partitioned biomass must be on the same observation dates
c. The same order of observations must be followed.

Steps:

a. Verify that '**PARAM.EXE**' is in the folder that contains the parameterization control file (***Param.in***),
b. Double click the application.
c. Open the output file (***param.out***).
d. Copy the values of variables listed in the output file into crop file.

NOTES:

*i. For partition parameters, the negative value should be changed to **0.0**, and value larger than should be changed to **1.0**.*

*ii. For table variables with DVS for first column, the first row for DVS is **0.0** and last row for DVS is **2.5** should be added as needed.*

4.2. Soil parameterization

The application, '**SOILHYDRAU.EXE'**, can be used to estimate soil hydraulic parameters based on available data on soil texture and organic matter.

Steps:

a. Open the template of soil parameterization input file (see Appendix 9 of Training Handouts).
b. Input the corresponding values for the user's soil data.
c. Save it into a separate folder; file name as designated by the user.
d. Double click application, '**SOILHYDRAU.EXE'**.
e. Select input file in the pop-up window display.
f. Open file '***HYDR_PARAM.TXT'*** in the folder where the input file was saved.
g. Copy the values for the parameters in the ***HYDR_PARAM.TXT*** to change the corresponding values in the soil file.

Part 5: Calibration

5.1. Option 1: Manual calibration

Please read Chapter III of Training Handouts

5.2. Option 2: Auto-Calibration

Prerequisites:

a. Parameterized crop file
b. Experimental file
c. Parameterized soil file (needed for water and/or nitrogen limited conditions)
d. Weather
e. Rerun file (needed for multiple treatments and/or multiple environments)

Steps

a. Open the autocalibration control file template (see Appendix 8 of Training Handouts).
b. Modify the input and output folder path and file names accordingly.
c. Identify the crop and soil parameters that you would like to calibrate.
d. Change the parameter setting and adjust the varying range of each parameter as desired.
e. Select the method to use for critical value limits and set their values accordingly.
f. Save it to target folder with the file name set by the user.
g. Double click the AutoCalibration application (***AutoCalibration(V2).exe***).
h. Select the autocalibration control file.
i. Wait for results.

****NOTES*:**

*i. The variable '**INRERUNS**' must set to 0 for calibration with single treatment and environment.*
*ii. You will know that the autocalibration is finished when you see '**OUTCROP**' and/or '**OUTSOIL**' in the folder where calibration was performed.*
*iii. If there is a suffix **'X'** in the output file/s generated, the calibration process produced the best calibrated parameter set possible after reaching the maximum number of iterations; the output does not necessarily meet all required criteria.*
*iv. If there is a suffix **'B'** in the output file/s generated, the calibration process produced the best calibrated parameter set possible which cannot be improved further with additional iterations; the output does not necessarily meet all required criteria.*