ALMANAC

User Guide and References

Manual for the Agricultural Land Management Alternatives with Numerical Assessment Criteria Model

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Quick Start on ALMANAC

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NOTE: The following tables are found in the ALMANAC Supplemental File

INTRODUCTION

The ALMANAC model was designed to simulate the interactions of two or more plant species competing for water, light, and nutrients. The competing species can be anything from mesquite trees in a bermudagrass pasture to a corn crop with a foxtail weed problem. ALMANAC also can be used to model typical farming monoculture such as a corn, sorghum, or wheat crop.

The purpose of this manual is to explain the logical progression of steps in running the model. Also information on how to create new datasets with UTIL (Universal Text Integrating Language) is included. This manual was written with the assumption that the user is: familiar with DOS and can manipulate files with an text editor..

CHAPTER 1:
ALMANAC DEMONSTRATION

To run an example of the ALMANAC model, first unzip the file named ALMANAC.ZIP in a new file folder called ALMANAC.

Once the files have been unzipped, access the DOS command prompt and change to the ALMANAC directory. The command to change to the ALMANAC directory is: c:\> **cd \almanac.** Then type the following command to execute the model:

At the prompt type: **ALNC2008 TXCORN.DAT**

This is a simulation of a corn crop grown in El Campo, Texas.

The execution will be complete when you get the C: prompt again. You may look at the results. Use any editor to look at the output file: **TXCORN.OUT .** Or type **LIST TXCORN.OUT.** List is a program that will load the output file and allow you to look at it. You may also just type the output file after the c: prompt which will open in file in “notebook”.

To run a sorghum crop for the same location as the corn crop, at the prompt type:
ALNC2008 TXSORG.DAT

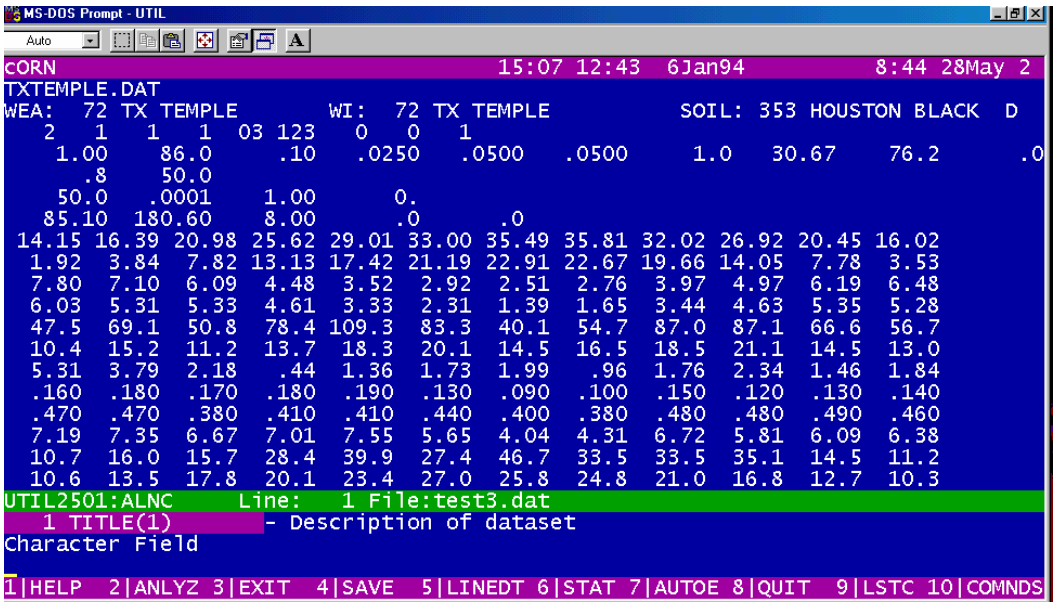
You may look at the output as before. The output file will be named **TXSORG.OUT.**
The output file is created automatically for you using your dataset name plus the extension: “.OUT”.

CHAPTER 2:
INTRODUCTION TO UTIL (A SMART EDITOR)

One easy way to edit the ALMANAC input files is to use the UTIL (Universal Text Integrating Language) program. UTIL identifies each formatted field in a file and provides help for that field. To see how UTIL works type:

UTIL ALNC TXCORN.DAT

The word - ALNC in the above command is the driver file. You will get a screen similar to this:



1 The first input field highlighted
2 This line shows the version of UTIL, the driver file that is loaded, the line number the cursor is on, and the name of the file currently loaded.
3 The variable name and its description of the highlighted field.
4 Displays type of variable, either character or the numerical range.
5 The command line - type in commands as those described later (Table 2).
6 Displays definitions of the function keys (Table 2). **Help key for information about each variable is F1**

To edit field one, place the cursor at field one using arrow keys, press the Enter key. Pressing the Enter key changes from COMMAND mode (the cursor at the bottom of the screen) to EDIT mode (the cursor on the field to be edited). Type the new information and press Return.

Some UTIL commands are available to load large groups of data from the weather and soils databases that are important inputs to the dataset. The commands most commonly used are the GETWEAT and GETSOIL. You type these commands in area 5 of UTIL, the command line. The cursor will be blinking when you are on the command line. Details on using these commands are as follows:

GETWEAT *SOME #* **WMO** - to insert weather generation parameters from a desired weather station (there are 70 locations for Mexico provided, see table 3).

GETWEAT 76665 **WMO**

GETSOIL - to load a soil from the United States soils database:

GETSOIL 240 Loads soil number 240, series Fitchville,(see table 4)

(No soils have been provided for Mexico, user will have to provide the values needed. See ALMANAC assembly sheets for minimum soils dataset needed)

USING UTIL TO EDIT OTHER ALMANAC INPUT FILES

There is one driver file for each ALMANAC input file. ALMANAC reads several files before execution takes place. (See Table 1 File Structure and Figure 1, Diagram of ALMANAC file structure and flow) These files can be edited if necessary. UTIL is available to edit these files as long as the correct driver file must is used with its corresponding ALMANAC file.

The rest of the input files may be edited in the same way with UTIL but for the beginner it is not expected that these additional files will be changed. However, UTIL is available if needed.

To edit the crop parameter file type:

UTIL CROP CROP2008.DAT

To edit the tillage file type:

UTIL TILL TILL2008.DAT

To edit the multi-year file type:

UTIL MLRN MLRN2008.DAT

To edit the print file type:

UTIL PRNT PRNT2008.DAT

To edit the control file type:

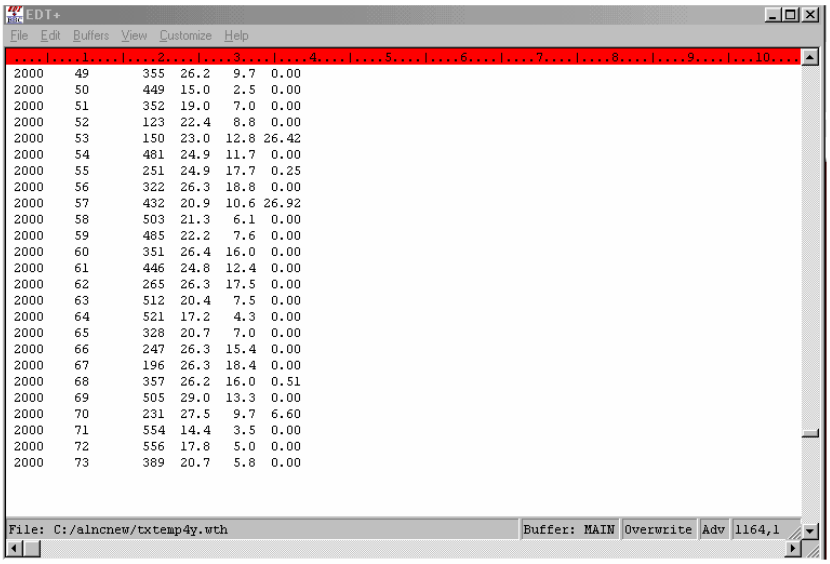
UTIL FILE ALNCFILE.DAT

CHAPTER 3:
WEATHER GENERATOR AND DAILY WEATHER FILE

In the dataset there is an option to generate weather or read daily weather (NGN). For long-term, decision-making it is suggested that weather be generated. However, for model testing, daily weather is usually read in. The entire year (365 days) or years must be input. If there are missing values for rainfall or maximum and minimum temperatures ALMANAC will generate these if the value in the corresponding field is set to 999. If solar radiation values are missing they will be generated if the field is left blank or entered as 0.

IF DAILY WEATHER IS READ THEN THE NAME OF THE DAILY WEATHER FILE MUST BE ON THE LAST LINE OF THE DATASET AFTER SKIPPING ONE BLANK LINE TO END THE LAST ROTATION SERIES.

The basic weather components entered in the weather file are: solar radiation (in either mega joules d^{-1} or langleys d^{-1}), maximum temperature (°C), minimum temperature (°C), and precipitation (mm) . If values for wind speed and relative humidity are known they may be entered also. However any combination of real weather values can be input as long as rain is an input. (See control code NGN in UTIL) Missing values for rain, and temperatures are generated if the value is set to 999. Solar radiation values are generated when field is left blank or is 0 . They are read in the order of SR, MAX, MIN, and RAIN by the following FORTRAN format: (16x,F4.0,F6.1,F6.1,F6.3). Below is an example of a weather file showing year and day in columns 1-16, solar radiation in columns 17-20, maximum temperature in column 21-26, minimum temperatures in column 27-32 and rain in columns 33-38.



CHAPTER 4:
UNITED STATES WEATHER

Available on request is a diskette which contains the monthly average information for about 200 locations for each state of the United States. If desired, one state at a time can be installed by following these directions:

1) Insert the United States Weather diskette in your disk drive.
2) At the C: prompt type the disk drive that the diskette is in and the state file name that you are interested in.

For example: The weather diskette is in drive A: and you want Texas weather, type the command **A**:**TXZIP**: your command line should look like this:

C: **A:TXZIP**

Following this command a self-extracting utility will unzip the Texas weather files and you will now have the weather file called weattx.dat, the wind file: windtx.dat and a list file :weattx.lis.

The following explains how to load these weather parameters automatically in your data set by using the LOCWEAT command of the UTIL dataset editing program.

While editing a dataset with UTIL, get on the command line and type:

LOCWEAT 31.5 97.0 <return> Locates and loads a weather station closest to latitude 31.5 and longitude 97.0 from the weather data base you have installed from the United States Weather diskette.

Table 1. ALMANAC FILES - names and descriptions of files on the ALMANAC diskette.

Name	Description
MODEL	
ALNC2008.EXE	Compiled version of the ALMANAC Model.
DATABASE FILES	
Crop2008.DAT	Established parameters for several crops and weeds.
TILL2008.DAT	Farm machinery table.
CONTROL FILES	
PRNT2008.DAT	Output control file.
MLRN2008.DAT	Multi_period control file.
MODEL DEVELOPMENT FILE	
PARM2008.DAT	Experimental paramaters used in developing and modifying the model. These are essentially constants.
USER DATASETS	
TXCORN.DAT	Simulation of a corn crop in El Campo, TX
TXSORG.DAT	Simulation of a sorghum crop in EL Campo, TX
CORNSOY.DAT	Simulation of corn/soybean intercropping in Temple, TX..
SOYBEAN.DAT	Simulation of soybean growth without corn competition.
TNACKH.DAT	Simulation of soybean/johnsongrass interaction in Jackson, TN.
TNJACKA.DAT	Simulation of soybean growth without weed competition.
MESBER.DAT	Bermuda grass pasture invaded by Mesquite trees
TNJACKH.WTH	Weather file for Jackson, TN.
TXDANE98.WTH	Weather file for El Campo, TX
MOR78-93.WTH	Weather file for Morelia, MI, MEXICO
DRIVER FILE	
ALNCFILE.DAT	This file contains the names of the above files that the model needs to know to be able to execute and also a user named file for ALMANAC to write to.
OUTPUT FILES	
TXCORN.OUT	Results from ALMANAC simulation are written to
TXSORH.OUT	The *.OUT file
CORNSOY.OUT	
SOYBEAN.OUT	
OTHER FILES	
UTIL.EXE	Editor for ALMANAC datasets

ALMANAC FILE STRUCTURE

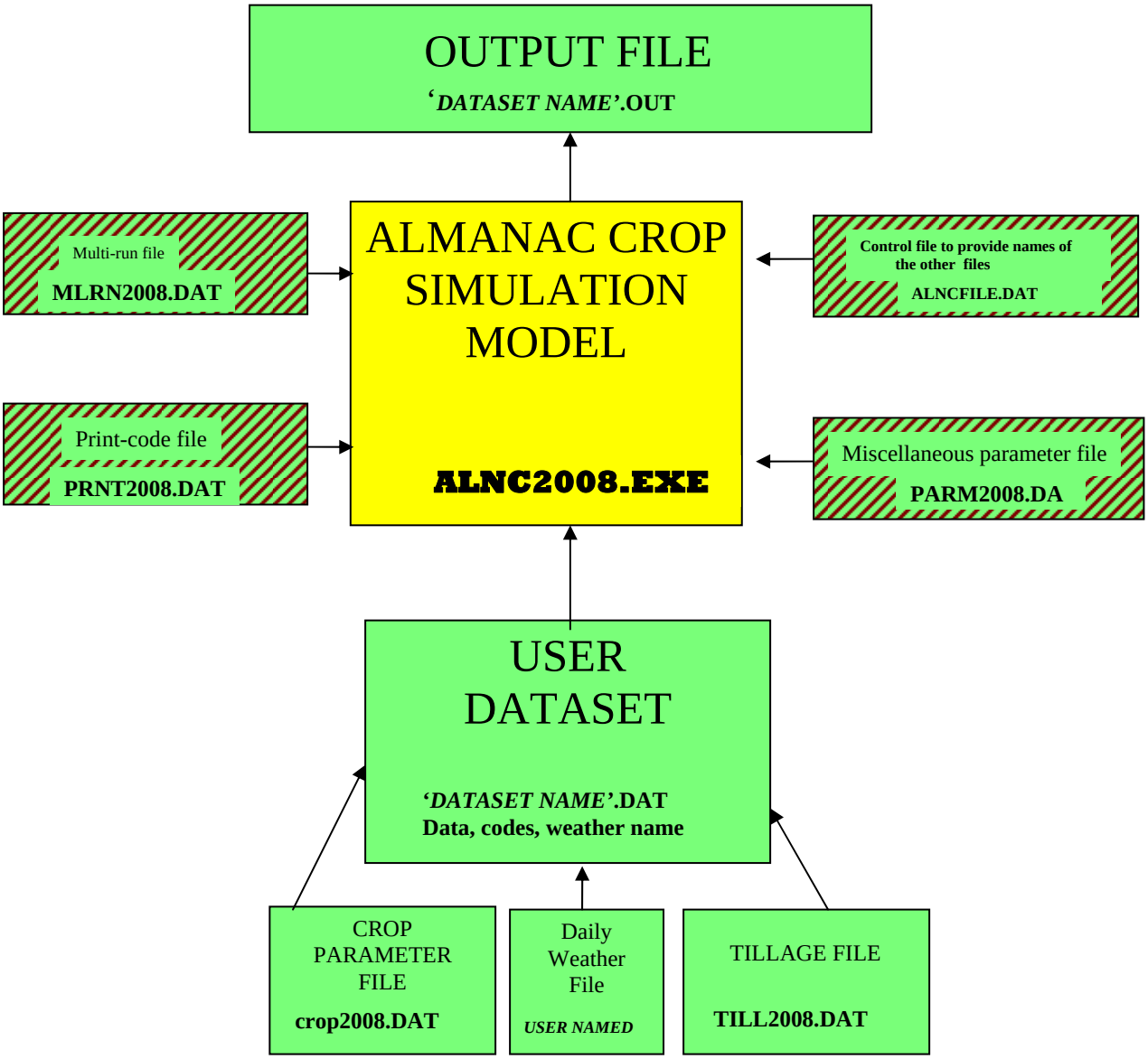


Figure 1. ALMANAC file structure

Table 2. Description of UTIL Function Keys.

HELP _ the [F1] key

The HELP command reads the HELP file for information specific to the current VARIABLE. By placing the cursor on a VARIABLE, and entering the command "HELP" or pressing the F1 key, UTIL displays information for that VARIABLE. Some VARIABLE's have interactive HELP in which case a menu appears with several choices. The cursor or arrow keys are used to chose one of the options. If the cursor is on the choice that is desired, the <Enter> key will insert this new value into the DATASET. By pressing either the [F1] key or the <ESC> key no choice is made and the value that is in the DATASET remains.

ANALYZE _ the [F2] key (DO NOT USE)

EXIT _ the [F3] SAVE/EXIT key

This command will EXIT the UTIL program and WILL automatically SAVE the current DATASET. To SAVE without EXITing use the [F4] SAVE key. To EXIT without saving the DATASET use the [F8] QUIT/NOSAVE command.

SAVE _ the [F4] SAVE key

The SAVE command works in conjunction with the LOAD command to SAVE a dataset that is currently LOAD'ed in UTIL. There are options to save the current file without entering the name again.

FORMAT:

SAVE filename.ext
SAVE filename.ext REP
SAVE filename.ext REP BLANKS
SAVE * REP

WHERE:

1 SAVE filename.ext saves a new filename for the first time.
2 SAVE filename.ext REP will replace the old version, should one already exist.
3 SAVE filename.ext REP BLANKS will save all the blank lines. Normally, UTIL removes any blank lines from the bottom of a DATASET.
4 The SAVE * saves the DATASET with the same name as the one that was last LOADed. Should it already exist, UTIL will ask if it alright to write over it.
5 SAVE * REP is a complete command that will SAVE the file under the LOADed name and REPlace it if it already exists.

EDLIN _ the [F5] key

The EDLIN command may be typed in or the [F5] key may be pressed. The line that the cursor is on will be edited as an entire line rather than by fields.

QUIT _ the [F8] QUIT/NOSAVE key

Exits the UTIL program without saving the current DATASET.

DELETE _ the [Delete] key

CAREFUL! This command immediately deletes the line in the DATASET that the UTIL cursor is currently on.

INSERT _ the [Insert] key

CAREFUL! The INSERT command is the compliment to the DELETE command. This command should NOT be used unless the documentation for a specific application directly instructs to do so.

COMMANDS _ the [F10] key

Displays some of the most used commands by typing COMMANDS or press the [F10] key.

*****FORM 1*****
ALMANAC DATA ASSEMBLY FORM
(inputs not necessary for model execution are shaded)

Title

1.1	_____	TITLE(1)
2.1	_____	TITLE(2)
3.1	_____	TITLE(3)

Program control codes

4.1	Number of years of simulation	_____	NBYR
4.2	Starting date - Year	_____	IYR
4.3	-Month	_____	IMO
4.4	-Day	_____	IDA
4.5	Printout interval[1]	_____	NIPD
4.6	Output print code	_____	IPD
4.7	Weather code	_____	NGN
4.8	Number of times generator cycles[1]	_____	IGN
4.9	Day weather generator stops generating same weather[1]	_____	IGSD

General data

5.1	Watershed drainage area (ha)	_____	WSA
5.2	Runoff curve number	_____	CN2
5.3	Channel Length1 (Km)	_____	CHL
5.4	Average channel slope1 (m/ m)	_____	CHS
5.5	Channel roughness factor(manning's N)	_____	CHN
5.6	Surface roughness factor(manning's N)	_____	SN
5.7	Peak runoff-rate rainfall-energy adjustment factor	_____	APM
5.8	Latitude of watershed (degrees)	_____	YLT
5.9	Average elevation of watershed[2] (m)	_____	ELEV
5.10	Water content of snow on ground at start of simulation (mm)	_____	SNO

1 May be left blank or 0 if unknown
2 Leave blank if Priestly-Taylor is used to estimate potential evaporation, must enter for Penman.

***** FORM 2 *****
ALMANAC DATA ASSEMBLY FORM

6.1	Average concentration of nitrogen in rainfall (g m^3)	_____	RCN
6.2	Number of years of cultivation before simulation starts (yr.)	_____	RTN
	Water erosion data		
7.1	Slope length (m)	_____	SL
7.2	Slope steepness (m /m)	_____	S
7.3	Erosion control practice	_____	PEC
7.4	Water erosion equation[1]	_____	DRV

1 May be left blank or zero if unknown.

***** FORM 3 *****

ALMANAC DATA ASSEMBLY FORM

(*light shaded area do not have to be entered if daily weather is input, dark shaded areas does not have to be input regardless of whether daily is input or weather generator is used***)**

Weather data

8.1	Number of years of max monthly 0.5 hour rainfall record	_____	TP5
8.2	Ten year frequency 6 hour rainfall	_____	TP6
8.3	Number of years of max monthly 0.5 hour rainfall record	_____	TP24

9.1-9.12 Average monthly maximum air temperature (°C) — OBMX (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

10.1-10.12 Average monthly minimum air temperature (°C) — OBMN (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

11.1-11.12 Monthly standard deviation maximum air temperature [2,3] (°C) — SDTMX (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

12.1-12.12 Monthly standard deviation minimum air temperature [2,3,] (°C) — SDTMN (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

13.1-13.12 Average monthly precipitation (mm) — RMO (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

14.1-14.12 Monthly standard deviation of daily precipitation[1,3] (mm) — RST2 (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

15.1-15.12 Monthly skew coefficient for daily precipitation [1,3] — RST3 (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

16.1-16.2 Monthly probability of wet day after dry day [3,4] — PRW1 (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

17.1-17.12 Monthly probability of wet day after wet day [3,4] — PRW2 (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

18.1-18.12 Average number of days of rain per month[5] — DAYP (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

19. 1 12 Monthly maximum 0.5 hour-rainfall for period of record (TP24)[1] (mm) [in.] — WI (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

20.1-20.12 Monthly average daily solar radiation (MJ/m^2 or ly) — OBSL (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

21.1 21.12 Monthly average relative humidity (fraction)[6] — RH (1-12)

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

1 may be left blank or zero if unknown..
2 Temperature extremes may be substituted.
3 May be left blank or zero if daily rainfall is inputted (ref 4.7>>0).
4 Blank or zero if unknown and average number of days of rain per month is entered.
5 Blank or zero if rainfall is generated and wet-dry probabilities are entered.
6 May be left 0 unless Penman equation is used to estimate potential evaporation (elev > 0)

***** FORM 4 *****
ALMANAC DATA ASSEMBLY FORM

Wind erosion data

22.1	Field length[1,3] (km)	_____ FL
22.2	Field width[1,3] (km)	_____ FW
22.3	Clockwise angle of field from north[1,3] (deg)	_____ ANG
22.4	Standing dead crop residue[1] (t/ha)	_____ STD

Wind data

23.1	Power of modified exponential distribution of wind speed[1,2,3]	_____ UXP
23.2	Climate factor[1,3]	_____ DIAM
23.3	Wind erosion adjustment factor[3]	_____ ACW

24.1-24.12	Average monthly wind velocity[2,3] (m/s)	UAVM(1-12)
	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	
25.1-25.12	N wind during each month[3] (%)	DIR1 (1-12)
	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	
26.1	NNE wind during each month[3] (%)	DIR2 (1-12)
26.12	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	
27.1	NE wind during each month[3] (%)	DIR3 (1-12)
27.12	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	
28.1	ENE wind during each month[3] (%)	DIR4 (1-12)
28.12	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	
29.1	E wind during each month[3] (%)	DIR5 (1-12)
29.12	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	
30.1	ESE wind during each month[3] (%)	DIR6 (1-12)
30.12	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	
31.1	SE wind during each month[3] (%)	DIR7 (1-12)
31.12	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	
32.1	SSE wind during each month[3] (%)	DIR8 (1-12)
32.12	_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	

1 May be left blank or zero if unknown.
2 May be left blank if Priestley-Taylor method is used to estimate potential evaporation and wind erosion is not estimated.
3 May be left blank or zero if wind erosion is not estimated.

***** FORM 5 *****
ALMANAC DATA ASSEMBLY FORM

33.1- S wind during each month[1] (%) DIR9 (1-12)
33.12 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

34.1- SSW wind during each month[1] (%) DIR10 (1-12)
34.12 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

35.1- SW wind during each month[1] (%) DIR11 (1-12)
35.12 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

36.1- WSW wind during each month[1] (%) DIR12 (1-12)
36.12 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

37.1- W wind during each month[1] (%) DIR13 (1-12)
37.12 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

38.1- WNW wind during each month[1] (%) DIR14 (1-12)
38.12 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

39.1- NW wind during each month[1] (%) DIR15 (1-12)
39.12 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

40.1- NNW wind during each month[1] (%) DIR16 (1-12)
40.2 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

1 May be left blank if wind erosion is not estimated.

***** FORM 6 *****
ALMANAC DATA ASSEMBLY FORM

Soil data

41.1		Soil albedo	_____	SALB
41.2		Maximum number of soil layers[1]	_____	TSLA
41.3		Minimum thickness of maximum layer[1] (m)	_____	ZQT
41.4		Minimum soil profile thickness[1] (cm)	_____	ZF
41.5		Initial soil water content-fraction of field capacity[1]	_____	FFC
41.6		Minimum depth to water table[1] (m)	_____	WTMN
41.7		Maximum depth to water table[1] (m)	_____	WTMX
41.8		Initial depth to water table[1] (m)	_____	WTBL
41.9	soil	weathering code[1]	_____	XIDS
41.10	Time for sub surface flow travel time(d)[1]		_____	RFTT

42.1-42.10	Depth from the surface to the bottom of the soil layer (m) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	Z(1-10)
43.1-43.10	Bulk density of the soil layer (t/m^3) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	BD (1-10)
44.1-44.10	Wilting point[1] (1500 kPa) (m/m) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	U (1-10)
45.1-45.10	Field capacity[1] (33kPa) (m/m) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	FC (1-10)
46.1-46.10	Sand content (%) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	SAN (1-10)
47.1-47.10	Silt content (%) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	SIL (1-10)
48.1-48.10	Organic N concentration1 (g/t) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	WN (1-10)
49.1-49.10	Soil pH _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	PH (1-10)

1 May be left blank or zero if unknown

***** FORM 7 *****
ALMANAC DATA ASSEMBLY FORM

50.1- 50.10	Sum of bases[1] (cmol/kg) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	SMB (1-10)
51.1- 51.10	Organic carbon (%) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	CBN (1-10)
52.1- 52.10	Calcium carbonate (%) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	CAC (1-10)
53.1- 53.10	Cation exchange capacity[1] (cmo[1]/kg) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	CEC (1-10)
54.1- 54.10	Coarse fragment content[1] (% vol) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	ROK (1-10)
55.1- 55.10	Initial Nitrate concentration[1] (g/t3) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	WNO3 (1-10)
56.1- 56.10	Labile P concentration[1] (g/t3) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	O (1-10)
57.1- 57.10	Crop residue[1] (t/ha) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	RSD (1-10)
58.1- 58.10	Bulk density (oven dry)[1] (t/m^3) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	BDD (1-10)
59.1- 59.10	Phosphorus sorption ratio[1] _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	PSP (1-10)
60.1- 60.10	Saturated conductivity[1] (mm/h) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	SC (1-10)
61.1- 61.10	Not used at this time, leave blank _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	
62.1- 62.10	Organic P concentration[1] (g/t) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	WP (1-10)

1 May be left blank or zero if unknown

***** FORM 8 *****

ALMANAC DATA ASSEMBLY FORM

(*shaded areas can be left as zero unless user provided irrigation values are to be considered or the automatic irrigator or automatic fertilizer option is to be used***)**

Management information - operation codes

63.1	Crop rotation duration (yr.)	_____	NRO
63.2	Rigid or variable irrigation (1=irrigate by user entered amounts, 0 = automatic irrigator or no irrigations)	_____	NIRR
63.3	Irrigation code[4] (0=dryland, >1=irrigated)	_____	IRR
63.4	Minimum application interval for automatic irrigation[1,4] (d)	_____	IRI
63.5	Minimum fertilizer application interval for automatic fertilizer[1] (d)	_____	IFA
63.6	Liming code[1]	_____	LM
63.7	Furrow dike code[1]	_____	IFD
63.8	Drainage code[1]	_____	IDR
63.9	Automatic fertilizer rigidity code[1] (1 = user entered amounts, 0=automatic fertilizer or no fertilizer)	_____	IFFR
64.1	Water stress factor to trigger automatic irrigation[1,4]	_____	BIR
64.2	Irrigation runoff ratio[1]	_____	EFI
64.3	Maximum annual irrigation volume allowed for each crop[1] (mm) [in.]	_____	VIMX
64.4	Minimum single application volume automatic irrigation[1] (mm) [in.]	_____	ARMN
64.5	Maximum single application volume automatic irrigation[1] (mm) [in.]	_____	ARMX
64.6	N stress factor to trigger automatic fertilizer[3]	_____	BFT
64.7	Amount of fertilizer (IDFT) per automatically scheduled application[1]	_____	FNP
64.8	Maxium annual N fertilizer application for a crop[1] (kg/ha) [lb./ac]	_____	FMX
64.9	Time required for drainage system to reduce stress[1] (d)	_____	DRT
64.10	Fraction of furrow dike volume available for storage[1]	_____	FDSF

1 May be left blank or zero if unknown.
2 May be left blank or zero if drainage is not used.
3 Must enter this to trigger automatic fertilzer option
4. Must enter this to trigger automatic irrigator

***** FORM 9 *****
ALMANAC DATA ASSEMBLY FORM

8.3 Management Information-Irrigation Fertilizer/Tillage Schedule
Management data begins on line 65 and continues for as many as 1 to 10 rotations. The irrigation, fertilization and tillage information are entered in that order for each rotation, but separated by one line. The look of this area will vary depending on what scenario is wanted. For instance, if automatic irrigation is picked, then there will be no lines entered for irrigation amounts. Similarly for automatic fertilizer.

Following are samples of management input lines based on different scenarios:

1. User has real values for irrigation, fertilization and is planting corn:

(NIRR =1, IRR = 1 OR 2)

```
* ( MON DAY    IRRIGATION AMOUNTS (MM))
* 04      15      50.0
* 05      15      50.0
*
* (MON   DAY    N APPLIED(KG/HA)    P APPLIED(KG/HA)  APPLICATION DEPTH)
* 03     05      120.0          35.0           50.0
*
* (MON   DAY  OPERATION #    CROP #    PHU     PLANTING DENSITY)
* 02     15      16                                    (OPERATION 16 IS A DISK BEDDER)
* 03     14      04        02      2000      5.0       (OPERATION 4 IS A PLANT  OPERATION., 02 IS CROP # )
* 07     15      07        02                          (OPERATION 7 IS A HARVEST OPERATON
                                                       ( CROP #2 IS CORN, MUST ENTER IT # AT HARVEST ALSO)
```

- *all lines are entered including blank lines except what is in italics; the asterisk is not entered*

2. User sets values for automatic irrigator, and automatic fertilizer option:

(IRR=1 or 2, IRI >0, BIR > 0) and (IFA > 0 and BFT > 0)

```
02     15      16
03     14      04      02      2000      5.0
07     15      07      02
```

3. User wants dryland corn, so no irrigation, but has values for fertilization:

```
 02    05     120.0        35.0         50.0

02     15     16
03     14     04     02     2000.     5.0
07      15    07     02
```

4. User has dryland corn and added no fertilizer:

```
02      05    0.0      0.0      0.0

02     15    16
03     14    04     02     2000.       5.0
07     15    07     02
```

***** FORM 10 *****
ALMANAC DATA ASSEMBLY FORM

9.1 Daily weather file name

This is entered only if you have chosen to input daily weather data.

Enter the complete file name, including directories (if necessary).

7 or 70 characters maximum in each file name

SKIP ONE LINE AFTER MANAGEMENT DATA BEFORE ENTERING WEATHER NAME.