VERSION

2.1

IBSNAT Project
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INTRODUCTION

THE IBSNAT PROJECT & DSSAT

BSNAT The International Benchmark Sites for Agrotechnology Transfer (IBSNAT) Project is a program of the Bureau for Science and Technology, Office of Agriculture, Division of Renewable Natural Resources, U.S. Agency for International Development implemented by the Department of Agronomy and Soil Science, College of Tropical Agriculture and Human Resources, University of Hawaii and its global network of collaborators under Cooperative Agreement No. DAN-4054-A-00-7081-00.

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ACKNOWLEDGEMENTS

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Several individuals who have been closely involved in DSSAT from the initial development stage to the culmination version 2.1 include the following. James W. Jones, Kenneth J. Boote, Gerrit Hoogenboom, and Shrikant S. Jagtap: University of Florida, Gainesville, Florida. Douglas C. Godwin, Carla G. Humphries, and Upendra Singh: International Fertilizer Development Center, Muscle Shoals, Alabama. J. Barry Dent and Philip K. Thornton: Edinburgh School of Agriculture, Edinburgh, Scotland. Clement Chan, Anthony J. Denault, Daniel S. Imamura, Agatha Y.C. Tang, and Gordon Y. Tsuji: University of Hawaii, Honolulu, Hawaii.

Editing, design, and production of the User's Guide were under the direction of Sharon L. Balas, editor; Susanne N. Yuu, graphics designer; and Earl J. Kim, publication manager, respectively.

Introduction to DSSAT

Welcome to the Decision Support System for Agrotechnology Transfer v2.1 (DSSAT v2.1) developed by the International Benchmark Sites Network for Agrotechnology Transfer (IBSNAT) Project.

Before you begin, make sure you read through the next several pages. They will briefly explain and tell you what the package contains and its hardware requirements.

DSSAT

DSSAT (pronounced deesat) v2.1 is a microcomputer software program combining soil, crop, and weather data bases, with crop models and application programs, to simulate multi-year outcomes of crop management strategies. Crop models for maize, wheat, soybean, peanut, and application programs for a weather estimation and strategy evaluation are included.

As a software package integrating the effects of soil, crop genotype, weather and management options, DSSAT allows users to ask "what if" questions and to seek answers by conducting, in a matter of a few hours on a desk top computer, experiments which would consume a significant part of an agronomist's career.

DSSAT also provides for validation of the crop models; this allows user's to compare simulated outcomes with observed results. Crop model validation is accomplished by inputting the user's minimum data set, running the model, and comparing outputs. By simulating probable outcomes of crop management strategies, DSSAT offers users information with which to explore the future and thus to rapidly appraise new crops, products, and practices for adoption.

The DSSAT Package

Your DSSAT v2.1 package should contain:

- The DSSAT v2.1 Program disks
  (either twelve, 5 1/4" disks; or five, 3 1/2" disks)
- The DSSAT v2.1 User's Guide
- The SOYGRO v5.42 User's Guide
- The PNUTGRO v1.02 User's Guide

- The CERES Wheat v2.1 User's Guide
- The CERES Maize v2.1 User's Guide

If you are missing any of the above items, contact the IBSNAT Project.

THE DSSAT PROGRAM DISKS

The DSSAT consists of the four following components, all of which are contained on the program disks.

- DSSAT Shell
- Data Base Management System (DBMS)
- Agrotechnology Transfer Applications
- Crop Models

Tables A and B list the names and descriptions of the 5 1/4" and 3 1/2" disks respectively. Take a moment to check that every program disk is contained in your DSSAT package.

DSSAT Shell

The DSSAT shell is designed for users with hard-disk microcomputer systems. From it, the DSSAT's remaining three components can be launched, allowing users easy selection and implemention of the DSSAT DBMS, Agrotechnology Transfer Applications, and Crop Model programs.

DBMS

The DSSAT DBMS effects the storage, organization, and retrieval of data in the DSSAT. Data collected by the user are entered through programs within the DBMS. Programs are also included which summarize and/or analyze data input. After entering data, the user can retrieve the information for use in the Agrotechnology Transfer Applications and Crop Model programs.

The DBMS consists of the following six programs, each program having a user's guide section within this DSSAT User's Guide.

- Experiment Data Entry
- Weather Data Entry
- Minimum Data Set (MDS) Summary Reports and Graphics
- Soil Data Retrieval for Crop Models
- MDS Retrieval for Crop Models
- Utilities

Agrotechnology Transfer Applications

The DSSAT Agrotechnology Transfer Application programs are designed for users with hard-disk microcomputer systems. These are decision-making tools which simulate outcomes of crop management practices. Application programs consist of the Weather Estimators program and the Strategy Evaluation program. Both programs have a user's guide section within this DSSAT User's Guide.

Crop Models

The DSSAT crop models are programs that simulate the development and growth processes of food crops with data entered into the DBMS. The crop models are able to predict dry matter growth, leaf area, phenological development, yield, and others depending upon the model. Four crop models (Maize, Soybean, Peanut, and Wheat) have been adapted and linked to the DSSAT v2.1.

User's guides for the crop models included in DSSAT v2.1 are not included in the DSSAT User's Guide; they are, however, part of the DSSAT package and are provided with DSSAT v2.1 as separate documents.

HARDWARE REQUIREMENTS

To use the DSSAT, you will need the following hardware configuration, in addition to the program disks.

Hard-disk Users

- An IBM PC-XT, PC-AT, or any fully IBM-compatible microcomputer with:
  –a minimum of 640K of random access memory (RAM); and
  –a graphics adaptor.
- Any dot-matrix printer with an IBM graphic mode.
- A math co-processor (optional).

NOTE: The DSSAT software will take up to 8 megabytes of hard-disk space.

Floppy-disk Users

- An IBM PC-XT, PC-AT, or any fully IBM-compatible microcomputer with:
  –dual floppy-disk drives (5 1/4" or 3 1/2");
  –a minimum of 640K of random access memory (RAM); and
  –a graphic adaptor.
- Any dot-matrix printer with an IBM graphic mode.
- A math co-processor (optional).

NOTE: With a floppy-disk system, the DSSAT Shell and the Strategy Evaluation and Weather Estimator Application programs cannot be used.

Table A. DSSAT distribution 5 1/4" disks used to install the DSSAT system.

Disk Name	Files	Description
System Installation	INSTALL. EXE	The DSSAT Installation program.
	SHELLH.ARC	Archive of the DSSAT Shell for hard disk.
	INTDATA.ARC	Archive of the DSSAT Shell's INTDSSAT.DAT file.
	PKXARC.EXE	Archive utility program.
	README	Important up-to-date instructions.
	PK36.EXE	Archive utility program.
Experiment Data Entry Forms A-H & Weather Data Entry Form C	MENUA_H.ARC	Archive executable file for Experiment Data Entry Forms A-H program.
	SUPPORT.ARC	Support data files for the DBMS programs.
	WEATHER.ARC	Archive of all files for the Weather Data Entry Form C program.
	PKXARC.EXE	Archive Utility program.
	ID.DAT	Installation identification codes.
Experiment Data Entry Forms I-S & Print Experiment Data Forms	MENUI_S.ARC	Archive executable file for Experiment Data Entry Forms I-S program.
	SUPPORT.ARC	Support data file for the DBMS programs.
	PRNTMDS.ARC	Archive executable file for Print Experiment Data Forms program.
	PKXARC.EXE	Archive utility program.
	ID.DAT	Installation identification codes.
DBMS Utilities & MDS Retrieval for Crop Models	UTILITY.ARC	Archive of all files for the DBMS Utilities program.
	PKXARC.EXE	Archive utility program.
	RETRIEVE.ARC	Archive of all files for the Experiment and Weather Retrieval for Crop Models program.
	ID.DAT	Installation identification codes.
MDS Summary Reports & Graphics	REPORTS.ARC	Archive of all files for the MDS Summary Reports and Graphics program.
	PKXARC.EXE	Archive utility program.
	ID.DAT	Installation identification codes.
Soil Data Retrieval for Crop Models	SDB.ARC	Archive of all files for the Soil Data Retrieval for Crop Models program.
	SOILCODE.ARC	Archive of all code files for the Soil Program.

Disk Name	Files	Description
	PKXARC.EXE	Archive utility program.
	ID.DAT	Installation identification codes.
Soil Data Files	SOILDATA.ARC	Archive of all soil data base files.
	PKXARC.EXE	Archive utility program.
	ID.DAT	Installation identification codes.
Crop Model Graphics	GR_MODEL.ARC	Archive of all the files needed for the model Graphics program.
	PKXARC.EXE	Archive utility program.
	ID.DAT	Installation identification codes.
Maize Model & Wheat Model	MZ_MODEL.ARC	The executable file for the Maize model.
	MZ_DATA.ARC	The sample data file for the Maize model.
	WH_MODEL.ARC	The executable file for the Wheat model.
	WH_DATA.ARC	The sample data file for the Wheat model.
	PKXARC.EXE	Archive utility program.
	ID.DAT	Installation identification codes.
Peanut Model & Soybean Model	PN_MODEL.ARC	The executable file for the Peanut model.
	PN_DATA.ARC	The sample data file for the Peanut model.
	SB_MODEL.ARC	The executable file for the Soybean model.
	SB_DATA.ARC	The sample data file for the Soybean model.
	PKXARC.EXE	Archive utility program.
	ID.DAT	Installation identification codes.
Strategy Evaluation	STRATEGY.ARC	All files needed for Strategy Evaluation.
	PKXARC.EXE	Archive utility program.
	HISTDATA.ARC	Historical weather data.
	ID.DAT	Installation identification codes.
Weather Estimators	WGEN.ARC	All files needed for WGEN.
	WMAKER.ARC	All files needed for WMAKER.
	PKXARC.EXE	Archive utility program.
	ID.DAT	Installation identification codes.

Table B. DSSAT distribution 3 1/2" disks used to install the DSSAT system.

Disk Name	Files	Description
System Installation & Experiment Data Entry Forms A-H & Weather Data Entry Form C	ID.DAT	Installation identification codes.
	README	Important up-to-date instructions.
	PK36.EXE	Archive utility program.
	PKXARC.EXE	Archive utility program.
	INSTALL.EXE	The DSSAT Installation program.
	SHELLH.ARC	Archive of the DSSAT Shell for hard disk.
	INTDATA.ARC	Archive of DSSAT Shell's INTDSSAT.DAT file.
	MENUA_H.ARC	Archive executable file for Experiment Data Entry Forms A-H program.
	WEATHER.ARC	Archive of all files for the Weather Data Entry Form C program.
	SUPPORT.ARC	Support data files for the DBMS programs.
Experiment Data Entry Forms I-S & Print Experiment Data Forms & DBMS Utilities & MDS Retrieval for Crop Models	ID.DAT	Installation identification codes.
	PKXARC.EXE	Archive utility programs.
	MENUI_S.ARC	Archive executable file for Experiment Data Entry Forms I-S program.
	PRNTMDS.ARC	Archive executable file for Print Experiment Data Forms program.
	UTILITY.ARC	Archive of all files for the DBMS Utilities program.
	RETRIEVE.ARC	Archive of all files for the Experiment and Weather Retrieval for Crop Models program.
	SUPPORT.ARC	Archive data file for the above programs.
MDS Summary Reports & Graphics & Soil Data Retrieval for Crop Models & Soil Data Files	ID.DAT	Installation identification codes.
	PKXARC.EXE	Archive utility program.
	REPORTS.ARC	Archive of all files for the MDS Summary Reports and Graphics program.
	SDB.ARC	Archive of all files for the Soil Data Retrieval for Crop Models program.
	SOILCODE.ARC	Archive of all code files for the Soil Program.
	SOILDATA.ARC	Archive of all soil data base files.

Disk Name	Files	Description
Crop Model Graphics	ID.DAT	Installation identification codes.
&	PKXARC.EXE	Archive utility program.
Maize Model	GR_MODEL.ARC	Archive of all the files needed for the model Graphics program.
&		
Wheat Model	MZ_MODEL.ARC	The executable file for the Maize model.
&	MZ_DATA.ARC	The sample data file for the Maize model.
Peanut Model	WH_MODEL.ARC	The executable file for the Wheat model.
	WH_DATA.ARC	The sample data file for the Wheat model.
	PN_MODEL.ARC	The executable file for the Peanut model.
	PN_DATA.ARC	The sample data file for the Peanut model.
Soybean Model	ID.DAT	Installation identification codes.
&	PKXARC.EXE	Archive utility program.
Strategy Evaluation	SB_MODEL.ARC	The executable file for the Soybean model.
&	SB_DATA.ARC	The sample data file for the Soybean model.
Weather Estimators	STRATEGY.ARC	All files needed for Strategy Evaluation.
	HISTDATA.ARC	Historical weather data.
	WGEN.ARC	All files needed for WGEN.
	WMAKER.ARC	All files needed for WMAKER.

Appendix
INSTITUTE CODE

ID	Institute Name
AC	Arab Center for Studies of Arid Zones and Dry Lands, Syria (ACSAD)
AI	Agency for Agricultural Research and Development, Indonesia (AARD)
AP	A.P. Agricultural University, India
AT	Asian Vegetable Research and Development Center, Taiwan (AVRDC)
CA	Centro Agronomico Tropical de Investigation y Ensenanza, Costa Rica (CATIE)
CC	Centro Internacional de Agricultura Tropical, Colombia (CIAT)
CH	National Chung-Hsing University, Taiwan
CL	North Central Conservation Research Lab., USDA-ARS
CD	Cornell University
CP	Centro Internacional de la Papa, Peru (CIP)
CR	Center for Soil Research, Indonesia (CSR)
CS	Commonwealth Scientific and Industrial Research Organization, Australia (CSIRO)
CV	Centro Nacional de Investigaciones Agropecuarias, Venezuela
DN	Department of Scientific and Industrial Research, New Zealand (DSIR)
DT	Department of Agriculture, Thailand (DOA)
EB	Empresa Brasileira de Pesquisas Agropecuaria, Brazil (EMBRAPA)
ER	Economic Research Service (ERS)
FA	Food and Agriculture Organization, United Nations (FAO)
FF	Food and Fertilizer Technology Center for the Asian & Pacific Region, Taiwan (FFTC/ASPAC)
FN	Fondo Nacional de Investgaciones Agropecuarias, Venezuela (FONIAP)
GA	University of Georgia
GT	Grassland, Soil and Water Research Laboratory (ARS)
GU	Gujarat Agricultural University, India
HA	Haryana Agricultural University, India
IA	Institut National de la Recherche Agronomique, Yaounde, Cameroon (INRA)
IB	International Benchmark Sites Network for Agrotechnology Transfer (IBSNAT)
IC	Indian Council for Agricultural Research (ICAR)
ID	Instituto de Investigacion Agropecuaria de Panama (INIAP)
IE	International Center for Agricultural Research in Dry Areas, Syria (ICARDA)

ID	INSTITUTE NAME
IF	International Fertilizer Development Center (IFDC)
IN	Institut National de la Recherche Agronomique, Toulouse, France (INRA)
IR	International Rice Research Institute, Philippines (IRRI)
IS	International Soybean Program (INSOY)
IT	International Crops Research Institute for the Semi-arid Tropics, India (ICRISAT)
IU	Iowa State University
KK	Khon Kaen University, Thailand
LC	Lincoln College, New Zealand
LU	Louisiana State University
MA	Malaysian Agricultural Research & Development Institute (MARDI)
MI	Ministry of Primary Industries, Fiji (MPI)
MP	Marathwada Agricultural University, India
MS	Michigan State University
MU	Mississippi State University
NB	National Bureau of Soil Survey and Land Use Planning, India (NBSS/LUP)
NC	North Carolina State University
NI	Nitrogen Fixation by Tropical Agricultural Legumes (NifTAL)
NO	National Oceanographic and Atmospheric Administration (NOAA)
OK	Oklahoma State University
OR	Office de la Recherche Scientifique et Technique Outre-Mer, France (ORSTOM)
OS	Oregon State University
PA	Pakistan Agricultural Research Council (PARC)
PC	Philippines Council for Agriculture and Resources Research and Development (PCARRD)
PP	Peanut Production, Disease and Harvesting Research, USDA-ARS
PR	Purdue University
PU	Punjab Agricultural University, India
QD	Queensland Department of Primary Industry, Australia
QU	University of Queensland, Australia
SC	Soil and Crop Evaluation Project (SCEP)
SP	University of South Pacific, Fiji
TA	Texas A & M University, College Station
TH	Land Development Department, Thailand (LDD)
TN	Tamil Nadu Agricultural University, India
UB	University of Burundi
UC	University of Guelph, Canada
UF	University of Florida
UG	University of Guam
UH	University of Hawaii

ID	Institute Name
UI	University of Illinois
UJ	University of Jordan
UM	University of Melbourne
UN	Universtiy of Nebraska
UP	University of Puerto Rico
US	Utah State University
UZ	University of Zambia
WS	Washington State University

GLOSSARY

Terms	**Definitions**
ASCII	American Standard code for information interchange; a standard for coding characters as bits of data.
CERES Maize	Crop-Environment Resource Synthesis Maize model.
CERES Wheat	Crop-Environment Resource Synthesis Wheat model.
CPF	Cumulative Probatility Function.
Crop Code	Two character code corresponding to each crop.
dap	Days after planting.
DBMS	Data Base Management System.
DOS	Disk Operating System.
Drive	The letter representing the drive where appropriate data are located.
DSSAT	Decision Support System for Agrotechnology Transfer.
ET	Evapotranspiration.
FSD	First-Order Stochastic Dominance.
IBSNAT	International Benchmark Sites Network for Agrotechnology Transfer.
Institute ID	Two character code given by IBSNAT for a collaborating institute.
K	1024 bytes.
KRCF	Precipitation Correction Factor.
KTCF	Temperature Correction Factor Code.
MDS	Minimum Data Set.
Pathname	Route to the subdirectory where the appropriate data are located.
PNUTGRO	Peanut Model.
RAM	Random Access Memory.
SCS	Soil Conservation Services.
SD	Standard Deviation.
Site ID	Two Character Code given by an institute for the site of an experiment.
SOYGRO	Soybean Model.
SPROFILES	Crop Model Input files that contains soil properties.
SSD	Second-Order Stochastic Dominance.
TR1, 3rd ed.	IBSNAT Technical Report 1, third edition.
TR5	IBSNAT Technical Report 5.
Weather Station ID	Two Character code for Weather Station.
WGEN	Weather Estimator using historic daily record.
WMAKER	Weather Estimator using historic daily record or monthly means.

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INSTALLATION GUIDE

Chapter 1
INSTALLATION

This chapter describes the DSSAT installation procedures for either a hard-disk or a floppy-disk system.

GETTING STARTED

Before you start, turn on your computer and make sure you have everything you need (see the "Introduction to DSSAT" section for a description of requirements).

Make backup copies of the distributed disks by using the DOS "DISKCOPY" command. Store the original disks in a safe place. The copies are your working disks. If they should become damaged or destroyed, use the original disk to restore the DSSAT.

Take a moment now to read the file named "README" which will be found on the DSSAT Installation Disk #1. This file contains any changes or instructions incorporated into DSSAT after this User's Guide was published.

DSSAT INSTALLATION

All DSSAT programs stored on the distributed disks are compressed using an archive utility. The installation program given on the DSSAT Installation System Disk #1 enables users to easily install DSSAT to a hard disk or transfer the programs to floppy disks. Because of disk-space limitations, however, floppy-disk users can transfer **ONLY** the Data Base Management System (DBMS) and Crop Model programs. The DSSAT Shell and the Strategy Evaluation and Weather Estimator programs require a hard-disk system.

To start the DSSAT installation, place the DSSAT Installation System Disk #1 in drive A. On a hard-disk system, change the DOS System C > prompt to the A > prompt. At the A > prompt, type "INSTALL," as shown:

```
A>INSTALL
```

A title screen and a description of the purpose of the installation program will be presented. The first menu you will encounter allows you to identify the configuration of your computer disk storage system.

The DSSAT consists of many different applications. There is a database management system for Minimum Data Sets, simulation models for various crops, and applications for agrotechnology transfer. Because of the size of the system, DSSAT has been distributed in a compressed format. This installation program will enable you to de-compress and transfer the DSSAT system to your computer's hard disk or floppy disks.

The procedure for installing the DSSAT to a hard-disk system is different from installing to a dual floppy-disk system.

Please identify the configuration of your computer.

F	Dual Floppy Drive
H	**Hard Drive**

Highlight the menu choice using the cursor key and press the <ENTER> key to select the menu item which corresponds to your system.

NOTE FOR HARD-DISK USERS: You can store the DSSAT programs in any location in your hard-disk. However, there are restrictions on some of the programs. The \DSSAT subdirectory must be located in drive C. Refer to Appendix A in this User's Guide for the DSSAT shell structure and description.

NOTE FOR FLOPPY-DISK USERS: You will need a minimum of 20 blank formatted 5 1/4" disks to create a floppy-disk version of DSSAT.

DSSAT installation for hard disk.

Please identify the drive to be used as the source drive. This drive will be used to read the compressed DSSAT programs.

A	**-**	**Drive A:**
B	-	Drive B:

Next, identify the drive used as the source drive. The source drive is used to read the archived files from the DSSAT installation disks. Select a drive from the menu. Please note that the source drive is used to read the installation disks, and you may not use this drive to output the DSSAT programs.

DSSAT HARD DISK INSTALLATION

Select the portion of the DSSAT you wish to install from the Main Menu.

MAIN MENU

S Install DSSAT Shell
D Install Data Base Mgt. System (DBMS)
C Install Crop Model
A Install Applications
Q Quit

After selecting the source drive, the DSSAT Installation main menu will appear. The installation program allows you to selectively install any program in DSSAT. However, it is suggested that you install the DSSAT Shell before any other application. (See Chapter 3 in this User's Guide for a explanation of the DSSAT Shell.)

When an option is selected from the menu, you will be prompted to insert the appropriate disks. You will be then asked for the location (drive and pathname) of the programs. A default location for each program will be given at the prompt. You can either keep the default information, by pressing <RETURN>, or enter another drive and pathname.

After the desired programs are installed, select "Q Quit" from the main menu to exit.

NOTE FOR FLOPPY-DISK USERS: Because the DSSAT Shell and Applications programs cannot be installed on a floppy-disk system, the DSSAT Installation main menu screen (above) will not offer the "S" and "A" options.

Refer to Table 1 for a listing of DSSAT programs and their disk-size requirements.

CHECK FILES

Hard-disk Users

Appendix B in this User's Guide lists files for each component of the DSSAT. Refer to these listings to check if all files are properly installed.

CONFIGURE YOUR SYSTEM

A CONFIG.SYS file must be created to set up the necessary configuration for your system.

Be sure you have a CONFIG.SYS file with the following statements in the root directory of your hard disk, or in your system disk if you are using a floppy-disk drive.

```
FILES = 20
BUFFERS = 10
DEVICE = ANSI.SYS
```

If you need help to create or add these statements to a CONFIG.SYS file, refer to "Create/Edit CONFIG.SYS" in Appendix C of this User's Guide.

Hard-disk Users Only

Add the drive and pathname of the DSSAT main directiory (i.e. C:\DSSAT) and model graphics directory (i.e. C:\DSSAT\STRATEGY) to your computer's path statement in the AUTOEXEC.BAT file. Example:

```
PATH C:\DSSAT; C:\DSSAT\STRATEGY
```

If you need help creating this statement, refer to "Create/Edit AUTOEXEC.BAT" in Appendix C of this User's Guide.

Table 1. DSSAT programs and floppy-disk size requirements.

Program Name	Comments
Experiment Data Entry Forms A-H	One 360K disk.
Experiment Data Entry Forms I-S	One 360K disk.
Print Experiment Data Forms	One 360K disk.
Weather Data Entry Form C	One 360K disk.
DSSAT Soil Data Files	One 360K disk.
Soil Data Retrieval for Crop Models	One 360K disk. This application also requires a minimum of 10K of free space on the disk.
MDS Summary Reports and Graphics	One 360K disk. This application also requires a minimum of 20K of free space on a disk.
MDS Retrieval for Crop Models	One 360K disk. This application also requires a minimum of 60K of free space on a disk. It is possit for the Retrieval program to use more than 100K foi large data sets.
DBMS Utilities	One 360K disk. This application also requires a minimum of 50K of free space on a disk.
Crop Model Graphic	One 360K disk.
Crop Models	One 360K disk for each crop model program.
Sample Data for Crop Models	One 360K disk for each crop model sample data. Note: All output is written to the data disk. You should always make sure there is ample room on th data disk for additional experiments and to hold the results of a simulation (at least 20K).

Floppy-disk Users only

CHAPTER 2
THE DSSAT SYSTEM

Having installed the DSSAT package on floppy disks, you should have a set of disks containing the DSSAT DBMS and Crop Model programs. This chapter briefly describes these programs. Detailed descriptions of these programs will be found in the program-specific section in the DSSAT User's Guide.

DBMS

By selecting the appropriate DBMS disk, you can run various programs to manipulate the experiment, weather, and soil data bases. Following is a brief description of the DBMS programs.

DATA ENTRY PROGRAMS

Experiment Forms A-H, except Form C. This program allows the user to input and edit experiment data found in Minimim Data Set (MDS) Forms A–H, except Form C.

Experiment Forms I-S. This program allows the user to input and edit experiment data found in MDS Forms I–S.

Print Experiment Forms. This program allows the user to print experiment data found in MDS Forms A–S, except Form C.

Weather Forms C. This program allows the user to input, edit, and print weather data found in MDS Form C.

RETRIEVAL PROGRAMS

Soil Data Retrieval. This program allows the user to add soil profile descriptions to FILE2 of the crop models (refer to IBSNAT TR5) from the soil data base or from data collected by the user.

MDS Retrieval for Crop Models. This program constructs input files for DSSAT crop models by retrieving data from the experiment and weather data base files created by the Experiment Data Entry program and the Weather Data Entry program, respectively. The Retrieval program creates crop model input files, FILES 1, 4, 5, 6, 7, 8, A, B and modifies crop model weather and experiment directory files (refer to IBSNAT TR5).

Summary Reports Program

MDS Summary Reports. This program produces the following reports:

- Chronological listing of events.
- Total substance, input by plots.
- Summary of preplant soil and fertility data.
- Weather data Summary Report.

Weather Graphics. This program produces the following weather data graphics:

- Maximum and minimum temperature vs. time.
- Degree days vs. time.
- Rainfall vs. time.
- Solar radiation vs. time.

Utilities Program

By selecting the DBMS Utilities program disk, you can execute the following functions.

Index Experiment Data Files This program rebuilds damaged index files of experiment data (Forms A–S, except C). For damaged weather data (Form C) files, execute the utility option under the Weather Data Entry program.

Convert ASCII Weather Data to MDS Format. If weather data are stored in as ASCII format, this utility can read the ASCII files to create the MDS data base files for Form C.

Upgrade Experiment Data Set to Version 2.1 Format. If experiment data was written with version 1.1 of the Data Entry program, this utility converts the data to version 2.1 for use with the DSSAT software. To upgrade the Weather Data Set from version 1.1 to 2.1, execute the Weather Data Entry program.

Modify IDs of an Experiment Data Set. This program modifies the Institute ID, Site ID, experiment number, year of the experiment, and crop code of an MDS.

Modify IDs of a Weather Data Set. This program modifies the Institute ID and Weather Station ID of a weather data set.

Import Harvest Data from ASCII Into Form R-2. This program imports crop data stored in an ASCII file into MDS Form R-2. If crop data are available in ASCII format, this utility can be used to import the data into Form R-2.

Minimum Data Set Master List Utilities. Although this program option is listed on the Utilities program disk, it cannot be executed by floppy-disk users.

CROP MODELS

By selecting a crop model disk, you can execute its model simulation or graphics program. IBSNAT plans to install the following crop models in DSSAT. Those marked with an asterisk (*) are available with version 2.1 of the DSSAT.

Aroids	Peanut*
Barley	Potato
Cassava	Rice
Dry Bean	Sorghum
Maize*	Soybean*
Millet	Wheat*

Crop Codes

The crop codes used in DSSAT that correspond to the above crops are as follows.

AR	- Aroids	PN	- Peanut
BA	- Barley	PT	- Potato
CS	- Cassava	RI	- Rice
BN	- Dry Bean	SG	- Sorghum
MZ	- Maize	SB	- Soybean
ML	- Millet	WH	- Wheat

Crop Model Programs

Crop Model Simulations. This program allows the user to run the crop model simulation.

Crop Model Graphics. This program allows the user to graph the results of the simulation.

Hard-disk Users only

CHAPTER 3
THE DSSAT SHELL

The DSSAT Shell is a menu-driven program which enables hard-disk us to easily select and use any of the DSSAT components. These compone: are displayed as menu items under the DSSAT title. Below is a sample screen showing the menus of the four components of the DSSAT systen

DECISION SUPPORT SYSTEM FOR AGROTECHNOLOGY TRANSFER Version 2.1

DBMS	Crop Models	Applications	Setup	Qui
E Data Entry	A Aroids	W Weather Estimators	D DBMS	
R Retrieval	B Barley	S Strategy Evaluation	C Crop Models	
S Summary	C Cassava		A Applications	
U Utilities	D Dry Bean		S Save Setup to Disk	
	M Maize			
	L Millet			
	P Peanut			
	T Potato			
	R Rice			
	S Sorghum			
	O Soybean			
	W Wheat			

↑ ↓ → ← moves you thru menu choices
ESC key exits the current menu

DSSAT Shell v2.1

DSSAT MAIN MENU

The bottom of the main menu screen will display a description of any hig lighted menu choice. For example, if the "E Data Entry" submenu under DBMS is opened and the first entry "A Experiment Forms A-H" is highlighted, the description would read:

"Enter/Edit descriptive information for an experiment in Forms A thru H.'

This means that by selecting this menu choice you will be able to enter experiment data in the Minimum Data Set (MDS) Forms A-H.

DBMS MENU The DBMS menu enables you to select various programs to manipulate the experiment, weather, and soil data bases. Following is a brief example of each menu choice.

E DATA ENTRY
Opens the Data Entry submenu containing the programs used to enter, edit, and print the MDS Forms. Below is the Data Entry submenu and a brief description of each menu choice.

A	Experiment Forms A-H
I	Experiment Forms I-S
P	Print Exp. Forms
W	Weather Form C

A EXPERIMENT FORMS A-H. This program allows the user to input and edit experiment data found in the Minimim Data Set (MDS) Forms A-H, except Form C.
I EXPERIMENT FORMS I-S. This program allows the user to input and edit experiment data found in MDS Forms I-S.
P PRINT EXPERIMENT FORMS. This program allows the user to print experiment data found in MDS Forms A-S, except Form C.
W WEATHER FORMS C. This program allows the user to input, edit, and print weather data found in MDS Form C.

R RETRIEVAL
Opens the Retrieval submenu containing the programs used to prepare the model input files from the data located in the Minimum Data Set. Below is the Retrieval submenu and a brief description of each menu choice.

S	Soil Data
E	MDS Data

S SOIL DATA. This retrieval program allows the user to add soil profile descriptions to FILE2 (refer to IBSNAT TR5) from the soils data base or from data collected by the user.
E MDS DATA. This retrieval program constructs input files for DSSAT

crop models by retrieving data from the experiment and weather data bas files created by the Experiment Data Entry program and the Weather Data Entry program, respectively. The program creates crop model input files, FILEs 1, 4, 5, 6, 7, 8, A, B and modifies crop model weather and experimen directory files (refer to IBSNAT TR5).

S SUMMARY

Opens the Summary submenu containing the program used to prepare various report and graphs from the data in MDS. Below is the "Summary" submenu and an explanation of each menu choice.

S	MDS Summary Reports
G	Weather Graphics

S MDS SUMMARY REPORTS. This program produces the following reports

Chronological listing of events.
Total substance, input by plots.
Summary of preplant soil and fertility data.
Weather data Summary Report.

G WEATHER GRAPHICS. This program produces the following weather data graphics:

Maximum and minimum temperature vs. time.
Degree days vs. time.
Rainfall vs. time.
Solar radiation vs. time.

U UTILITIES

Executes the DBMS Utilities program which has the following functions.

INDEX EXPERIMENT DATA FILES. This program rebuilds damaged index files of experiment data (Form A–S except C). For damaged weather data (Form C) files, execute the utility option under the Weather Data Entry program.

CONVERT ASCII WEATHER DATA TO MDS FORMAT. If weather data are stored in an ASCII format, this utility can read the ASCII files to create the MDS data-base files for Form C.

UPGRADE EXPERIMENT DATA SET TO VERSION 2.1 FORMAT. If experiment data was entered with version 1.1 of the Data Entry program, this utility converts the data to version 2.1 for use with the DSSAT software. To upgrade the Weather Data Set from version 1.1 to 2.1, execute the Weather Data Entry program.

Modify IDs of an Experiment Data Set. This program modifies the Institute ID, Site ID, experiment number, year of experiment, and crop code of an MDS.

Modify IDs of a Weather Data Set. This program modifies the Institute ID and Weather Station ID of a weather data set.

Import Harvest Data from ASCII Into Form R-2. This program imports crop data stored in an ASCII file into MDS Form R-2. If crop data are available in ASCII format, this utility can be used to import the data into Form R-2.

Minimum Data Set Master List Utilities. This program helps maintain the Experiment and Weather Data Master List, and a file containing the description and location of MDS. This utility creates and edits these lists and generates reports of data files.

CROP MODELS MENU

The Crop Models menu enables you to select a crop and execute its model simulation or graphics program. IBSNAT plans to install the following crops in DSSAT. Those marked with an asterisk (*) are available with version 2.1 of DSSAT.

Aroids	Peanut*
Barley	Potato
Cassava	Rice
Dry Bean	Sorghum
Maize*	Soybean*
Millet	Wheat*

After selecting a crop model, the following submenu will appear.

```
M  Model
G  Graphics
```

Selecting the "M Model" option will execute the crop model simulation, and the "G Graphics" option will execute the model graphics.

APPLICATIONS MENU

The Applications menu contains options that allow execution of the DSSAT applications. Below is a brief description of each menu choice.

G WEATHER ESTIMATORS

This program allows the user to select either the WGEN or WMAKER weather estimator by opening the following submenu.

G	WGEN
M	WMAKER

The "G WGEN" option estimates weather data based on daily weather data. The "M WMAKER" option estimates weather data using monthly means. After selecting the type of estimator, select either the coefficient program or the actual estimator from the following submenu.

D	Determine Coefficient
E	Estimate Data

S STRATEGY EVAUATION

This program allows the user to simulate various strategies over an extended time period. The results of the simulations can then be compared using variability analysis and stochastic dominance analysis to determine optimum management practices.

SETUP MENU

The Setup menu allows the user to specify the location of all the programs in the DSSAT. See Chapter 5 of this User's Guide for a detailed explanation of the Setup menu.

QUIT

The Quit option enables you to exit the DSSAT Shell.

Hard-disk Users only

CHAPTER 4
OPERATE THE DSSAT SHELL

All information given in this chapter presumes that the DSSAT system has been installed using the DSSAT installation procedures and that your computer system was configured as specified in Chapter 1 of this User's Guide.

To begin execution of the DSSAT system, type the letters "DSSAT" at your DOS prompt.

USING THE DSSAT SHELL

The key controls that enable you to move through and select menu items are explained below:

↑ ↓	Use these keys to move the cursor up or down within menus.
← →	Use these keys to move the cursor right or left among the main menu titles (i.e. DBMS, CROP MODELS, etc.)
<ENTER>	Press the <ENTER> key to select the highlighted menu choice.
<ESC>	Use the <ESC> key to exit the current menu.
<letter>	Each menu item consists of a letter and a name. Select any menu item by pressing the letter preceding the menu name. For example, if you are in the DBMS component menu, press the letter 'R' and the <ENTER> key to execute the menu choice "R Retrieval."

By using the keys defined above, you may select the application you wish to run. The DSSAT Shell then loads and executes the application.

If your DSSAT Shell's setup information for an application specifies drive A or B, a message will appear on the screen confirming the location of the program. For example, if you selected the "MDS Data" option under the Retrieval menu from the DBMS, the following message will appear.

Confirm location of Program

Execute Programs: A:\RETRIEVE.EXE

Please insure the program is located in the correct drive and path.

Press any key to continue <ESC to cancel>

This message confirms the location of the retrieval program. Line 2 displays the drive, directory, and program name of the selected menu choice. At this point, insert the disk containing the DBMS Retrieval program in drive A. Press any key to execute the Retrieval program. Or, press the <ESC> key to cancel this selection.

If the DSSAT Shell is unable to find the program or an invalid drive or directory location was specified, a message will be displayed. For example, if the Retrieval program is located at C:\DSSAT\RETRIEVE, but the setup was incorrectly given as C:\WRONG\DATABASE, then if you try to execute the Retrieval program, the following message will appear.

Error - Unable to Change\Drive Path

"C:\WRONG\DATABASE" is an invalid path.

Unable to change to the above directory. You may have specified an invalid drive or path in the setup.

Press any key to continue

NOTE: If you encounter any error in identifying the program location for a menu item, check the setup information and make corrections as necessary.

Hard-disk Users only

Chapter 5
HOW TO CHANGE THE SETUP IN THE DSSAT SHELL

Setup information specifies the default drives for each application in the DSSAT system. You may edit this information so it matches the DSSAT setup in your system.

EDIT SETUP

To change the Setup defaults, select the menu item "Setup" from the main menu bar. The following submenu will appear.

```
D   DBMS
C   Crop Models
A   Applications
S   Save Setup to Disk
```

Select the component you wish to edit. For example, if "D DBMS" is selected, the following screen will appear.

IBSNAT DECISION SUPPORT SYSTEM FOR AGROTECHNOLOGY TRANSFER

DBMS | Crop Models | Applications | Setup | Quit

Experiment Forms A-H
Experiment Forms I-S
Print Exp. Forms A-S
Weather Form C
Soil Data Retrieval
Exp. & Weather Retrieval
Summary Reports

Use the cursor key to select a menu item and press <ENTER> to edit its drive, path, and program name.

Press <ESC> when done with this menu.

Location of Program

DRIVE & PATH: **C : \DBMS\EXPER**

PROGRAM NAME: **MENUA_H.EXE**

Location of Data

DRIVE & PATH:

The window in the upper left hand corner of this screen shows all menu items in the DBMS Menu. The middle portion of the screen shows the setup information for the highlighted item. To view each menu item, use the ↑ and ↓ cursor keys to move through the menu. If you wish to edit the setup information, press the <ENTER> key on the highlighted item. While editing, the following keys can be used:

↑ ↓	– Use these keys to move to and from the drive, path and program name fields.
← →	– Use these keys to move 1 character left or right within a field.
<ENTER>	– Use this key to move to the next field or to exit the program if you are in the program name field.
<ESC>	– Use this key to exit the submenu.
<DEL>	– Use this key to delete the character identified by the cursor.

DBMS PROGRAMS

Selecting "D DBMS" from the Setup menu allows you to specify the location of the DBMS programs. The following list describes the menu items in the DBMS setup menu. For each item, enter the location of the drive and subdirectory, and the executable or batch file name, or use the default locations.

Exp. Entry Form A-H. The Experiment Data Entry program, Forms A-H.
Exp. Entry Form I-S. The Experiment Data Entry program, Forms I-S.
Print Forms A-S. The program to print the experiment data Forms A-S, except Form C.
Wea. Input Form C. The Weather Data Entry program, Form C.
Soil Retrieval. The Soil Retrieval for Crop Models program.
Exp. & Wea. Retrieval. The MDS Retrieval for Crop Models program.
MDS Summary Reports. The MDS Summary Report program.
Weather Graphics. The MDS Weather Graphics program.
DBMS Utilities. The Utilities program.

CROP MODELS

Selecting "C Crop Models" from the Setup menu allows you to specify the location of the crop model programs and their data files. The Crop Model menu items consist of the names of each crop model and the crop model graphics program. Identify the drive, subdirectory, and executable or batch-file name for each. In addition, enter the location of the drive and subdirectory for the crop model data directory, or use the default locations.

APPLICATIONS

Selecting "A Applications" from the Setup menu allows you to specify the location of the application programs. The following list explains the menu items in the application setup. For each item, enter the location of the drive and subdirectory for each model, or use the default locations.

WGEN Coefficient. WGEN estimates coefficients using daily weather data.
WGEN Data Estimator. The WGEN Weather Estimator program.
WMAKER Coefficient. WMAKER estimates coefficients using monthly summary data.
WMAKER Data Estimator. The WMAKER Weather Estimator program.
Strategy Evaluation. The Strategy Evaluation program.
Historical Weather Data. The location of any historical weather data.

SAVE THE DSSAT SETUP

If you wish to permanently save the edited setup to a disk file, select this option. The DSSAT Shell will save the setup information to C:\DSSAT\INTDSSAT.DAT. The next time you access DSSAT, your setup will be intact.

If you do not use this option, your changes will be lost when you exit the DSSAT system.

Hard-disk Users only

Appendix A
DSSAT STRUCTURE & DESCRIPTION

DSSAT STRUCTURE

```
DSSAT ──┬── DBMS ──────┬── EXPER
        │              ├── WEATHER
        │              ├── UTIL
        │              ├── RETRIEVE
        │              ├── SUMMARY
        │              └── SOIL ──────┬── CODELIB
        │                             └── DATA
        ├── MODEL ─────┬── MAIZE ──────────── DATA
        │              ├── PEANUT ─────────── DATA
        │              ├── SOYBEAN ────────── DATA
        │              ├── WHEAT ──────────── DATA
        │              └── GRAPH
        ├── STRATEGY ───── DATA
        ├── HISTDATA
        └── WGEN
```

NOTE: Each directory shown above can be installed in any location on your system with the exception of \DSSAT subdirectory which must be located in drive C: \DSSAT.

SYSTEM DESCRIPTION FOR HARD-DISK USERS

\DSSAT	This subdirectory stores the DSSAT Shell program and the Experiment and Weather Lists.
\DSSAT\WGEN	This subdirectory stores the Weather Estimators and the output files of the estimators.
\DSSAT\DBMS\EXPER	This subdirectory stores the experiment Data Entry and the Print Experiment Forms programs.
\DSSAT\DBMS\WEATHER	This subdirectory stores the Weather Data Entry program.
\DSSAT\DBMS\UTIL	This subdirectory stores the DBMS Utilities program.
\DSSAT\DBMS\RETRIEVE	This subdirectory stores the MDS Retrieval for Crop Models program.
\DSSAT\DBMS\SUMMARY	This subdirectory stores the MDS Summary Reports and Graphics programs.
\DSSAT\DBMS\SOIL	The two subdirectories \CODELIB and \DATA under this directory store the DSSAT soil data files.
\DSSAT\MODEL\MAIZE	This subdirectory stores the Maize Model program. The subdirectory \DATA under this directory stores the sample data.
\DSSAT\MODEL\PEANUT	This subdirectory stores the Peanut Model program. The subdirectory \DATA under this directory stores the sample data.
\DSSAT\MODEL\SOYBEAN	This subdirectory stores the Soybean Model program. The subdirectory \DATA under this directory stores the sample data.

\DSSAT\MODEL\WHEAT	This subdirectory stores the Wheat Model program. The subdirectory \DATA under this directory stores the sample data.
\DSSAT\MODEL\GRAPH	This subdirectory stores the Model Graphics program.
\DSSAT\STRATEGY	This subdirectory stores the Strategy Evaluation program.
\DSSAT\STRATEGY\DATA	This subdirectory stores the output files created by the Strategy Evaluation program.
\DSSAT\HISTDATA	This subdirectory stores sample historical weather data files, which can be used by the Strategy Evaluation program.

Appendix B
DSSAT LIST OF FILES

HARD-DISK USERS:

Directory \DSSAT

DBMS	<DIR>		7-31-89	2:10p	DSSAT	EXE	36055	7-31-89	12:00a
MODEL	<DIR>		7-31-89	2:10p	MDSINFO	DBF	512	7-31-89	12:00a
HISTDATA	<DIR>		7-31-89	2:10p	WEAINFO	DBF	512	7-31-89	12:00a
STRATEGY	<DIR>		7-31-89	2:10p	INTDSSAT	DAT	1056	7-31-89	12:00a
WGEN	<DIR>		7-31-89	2:10p					

Directory \DSSAT\DBMS

WEATHER	<DIR>		7-31-89	2:10p	RETRIEVE	<DIR>		7-31-89	2:10p
EXPER	<DIR>		7-31-89	2:10p	SUMMARY	<DIR>		7-31-89	2:10p
UTIL	<DIR>		7-31-89	2:10p	SOIL	<DIR>		7-31-89	2:10p

Directory \DSSAT\DBMS\EXPER

MENUA_H	EXE	236544	7-31-89	2:10p	IXPROD	NTX	2048	7-31-89	2:10p
CODE	DBF	27136	7-31-89	2:10p	PRODUCT	DBF	1978	7-31-89	2:10p
INSTITU	DBF	9151	7-31-89	2:10p	MENUI_S	EXE	278016	7-31-89	2:10p
INXSTITU	NTX	4096	7-31-89	2:10p	PRNTMDS	EXE	208896	7-31-89	2:10p
IXCODE	NTX	13312	7-31-89	2:10p					

Directory \DSSAT\DBMS\WEATHER

FMCUNIT	DBF	354	7-31-89	2:10p	FORMC2A	DBF	259	7-31-89	2:10p
FORMC	DBF	163	7-31-89	2:10p	INSTITU	DBF	9151	7-31-89	2:10p
FORMC1	DBF	258	7-31-89	2:10p	INXSTITU	NTX	4096	7-31-89	2:10p
FORMC1A	DBF	259	7-31-89	2:10p	WEATHER	EXE	237961	7-31-89	2:10p
FORMC2	DBF	226	7-31-89	2:10p					

Directory \DSSAT\DBMS\UTIL

CODE	DBF	27136	7-31-89	2:10p	IXCODE	NTX	13312	7-31-89	2:10p
FMCUNIT	DBF	414	7-31-89	2:10p	IXFORMC1	NTX	2048	7-31-89	2:10p
FORMC	DBF	163	7-31-89	2:10p	IXFORMC2	NTX	2048	7-31-89	2:10p
FORMC1	DBF	258	7-31-89	2:10p	IXPROD	NTX	2048	7-31-89	2:10p
FORMC1A	DBF	259	7-31-89	2:10p	LOCATE	EXE	10636	7-31-89	2:10p
FORMC2	DBF	226	7-31-89	2:10p	PRODUCT	DBF	1978	7-31-89	2:10p
FORMC2A	DBF	259	7-31-89	2:10p	TEMP80	DBF	4845	7-31-89	2:10p
INSTITU	DBF	9151	7-31-89	2:10p	TEMFC1	DBF	512	7-31-89	2:10p

INXSTITU	NTX	4096	7-31-89	2:10p	UTIL	EXE	240465	7-31-89	2:10p

Directory **\DSSAT\DBMS\RETRIEVE**

INSTITU	DBF	9151	7-31-89	2:10p	RETRIEVE	EXE	260349	7-31-89	2:10p
INXSTITU	NTX	4096	7-31-89	2:10p	TRACE	DBF	161	7-31-89	2:10p

Directory **\DSSAT\DBMS\SUMMARY**

ATT	BGI	6045	7-31-89	2:10p	IXCODE	NTX	13312	7-31-89	2:10p
CGA	BGI	6029	7-31-89	2:10p	IXPROD	NTX	2048	7-31-89	2:10p
CODE	DBF	27136	7-31-89	2:10p	LITT	CHR	2126	7-31-89	2:10p
DBREPORT	EXE	199379	7-31-89	2:10p	PRODUCT	DBF	1978	7-31-89	2:10p
EGAVGA	BGI	5139	7-31-89	2:10p	TEMP	DAT	10	7-31-89	2:10p
HERC	BGI	5933	7-31-89	2:10p	WEAGRAPH	BAT	128	7-31-89	2:10p
INSTITU	DBF	8128	7-31-89	2:10p	WGRAPH	EXE	61613	7-31-89	2:10p
INXSTITU	NTX	4096	7-31-89	2:10p					

Director **\DSSAT\DBMS\SOIL**

CODELIB	<DIR>		7-31-89	2:10p	GETSOIL	BAT	128	7-31-89	2:10p
DATA	<DIR>		7-31-89	2:10p	INSTITU	DBF	9151	7-31-89	2:10p
DATAFILE	DBF	66	7-31-89	2:10p	INXSTITU	NTX	4096	7-31-89	2:10p
DBF2ASC	EXE	180736	7-31-89	2:10p	SDB	EXE	72461	7-31-89	2:10p

Directory **\DSSAT\DBMS\SOIL\CODELIB**

COUNTRY	DBF	10752	7-31-89	2:10p	SCSCODES	DBF	41410	7-31-89	2:10p
IXCNTRY	NTX	5120	7-31-89	2:10p	SCSCODES	NTX	18432	7-31-89	2:10p

Directory **\DSSAT\DBMS\SOIL\DATA**

PROFHEAD	DBF	71300	7-31-89	2:10p	PROFLAYR	DBF	843244	7-31-89	2:10p

Directory **\DSSAT\MODEL**

GRAPH	<DIR>		7-31-89	2:10p	PEANUT	<DIR>		7-31-89	2:10p
MAIZE	<DIR>		7-31-89	2:10p	SOYBEAN	<DIR>		7-31-89	2:10p
WHEAT	<DIR>		7-31-89	2:10p					

Directory **\DSSAT\MODEL\GRAPH**

BRUN40	EXE	76816	7-31-89	2:10p	MAIN	EXE	11721	7-31-89	2:10p
GRPH	EXE	51623	7-31-89	2:10p	NEWPLT	EXE	93712	7-31-89	2:10p
HVGRF	EXE	17215	7-31-89	2:10p					

Directory **\DSSAT\MODEL\MAIZE**

MZV2	EXE	159007	7-31-89	2:10p	DATA	<DIR>		7-31-89	2:10p

DIRECTORY\DSSAT\MODEL\MAIZE\DATA

FLSC0109	W81	6803	7-31-89	2:10p	IBWA8301	MZ4	228	7-31-89	2:10p
FLSC8101	MZ4	76	7-31-89	2:10p	IBWA8301	MZ5	1408	7-31-89	2:10p
FLSC8101	MZ5	464	7-31-89	2:10p	IBWA8301	MZ6	1792	7-31-89	2:10p
FLSC8101	MZ6	191	7-31-89	2:10p	IBWA8301	MZ7	640	7-31-89	2:10p
FLSC8101	MZ7	194	7-31-89	2:10p	IBWA8301	MZ8	780	7-31-89	2:10p
FLSC8101	MZ8	260	7-31-89	2:10p	IBWA8301	MZA	640	7-31-89	2:10p
FLSC8101	MZA	190	7-31-89	2:10p	IBWA8301	MZB	2304	7-31-89	2:10p
GENETICS	MZ9	3770	7-31-89	2:10p	IBWA8301	MZC	640	7-31-89	2:10p
GLABEL	DAT	644	7-31-89	2:10p	IBWA8301	MZD	768	7-31-89	2:10p
GLABEL2	DAT	588	7-31-89	2:10p	MZEXP	DIR	868	7-31-89	2:10p
GLABEL3	DAT	518	7-31-89	2:10p	SIM	DIR	206	7-31-89	2:10p
GLABEL4	DAT	512	7-31-89	2:10p	SPROFILE	MZ2	23358	7-31-89	2:10p
IBSI0112	W80	9216	7-31-89	2:10p	UFGA0112	W82	16132	7-31-89	2:10p
IBSI0112	W81	13568	7-31-89	2:10p	UFGA8201	MZ4	222	7-31-89	2:10p
IBSI0112	W82	13568	7-31-89	2:10p	UFGA820	MZ5	1671	7-31-89	2:10p
IBSI0112	W83	13568	7-31-89	2:10p	UFGA8201	MZ6	804	7-31-89	2:10p
IBSI0112	W84	11392	7-31-89	2:10p	UFGA8201	MZ7	1086	7-31-89	2:10p
IBSI0112	W85	14208	7-31-89	2:10p	UFGA8201	MZ8	774	7-31-89	2:10p
IBSI8001	MZ4	128	7-31-89	2:10p	UFGA8201	MZA	570	7-31-89	2:10p
IBSI8001	MZ5	464	7-31-89	2:10p	UFGA8201	MZB	2688	7-31-89	2:10p
IBSI8001	MZ6	128	7-31-89	2:10p	UFGA8201	MZC	1280	7-31-89	2:10p
IBSI8001	MZ7	128	7-31-89	2:10p	UFGA8201	MZD	2176	7-31-89	2:10p
IBSI8001	MZ8	264	7-31-89	2:10p	WTH	DIR	770	7-31-89	2:10p
IBSI8001	MZA	256	7-31-89	2:10p	SETUP	FLE	66	7-31-89	2:10p
IBWA1010	W83	5540	7-31-89	2:10p					

DIRECTORY \DSSAT\MODEL\PEANUT

GRO	EXE	139666	7-31-89	2:10p	DATA	<DIR>		7-31-89	2:10p

DIRECTORY \DSSAT\MODEL\PEANUT\DATA

CROPPARM	PN0	3282	7-31-89	2:10p	UFGA7901	PN8	261	7-31-89	2:10p
GENETICS	PN9	7021	7-31-89	2:10p	UFGA7901	PNA	189	7-31-89	2:10p
GLABEL	DAT	1068	7-31-89	2:10p	UFGA7901	PNB	139	7-31-89	2:10p
GLABEL2	DAT	784	7-31-89	2:10p	UFGA8101	PN5	937	7-31-89	2:10p
GLABEL4	DAT	512	7-31-89	2:10p	UFGA8101	PN6	430	7-31-89	2:10p
INTRO	DAT	1914	7-31-89	2:10p	UFGA8101	PN8	391	7-31-89	2:10p
PNEXP	DIR	1116	7-31-89	2:10p	UFGA8101	PNA	283	7-31-89	2:10p
SIM	DIR	124	7-31-89	2:10p	UFGA8101	PNB	1684	7-31-89	2:10p
SPROFILE	PN2	23359	7-31-89	2:10p	UFGA8101	PNC	2304	7-31-89	2:10p
UFGA0112	W79	16130	7-31-89	2:10p	UFGA8401	PN5	625	7-31-89	2:10p
UFGA0112	W81	16131	7-31-89	2:10p	UFGA8401	PN6	378	7-31-89	2:10p
UFGA0112	W84	16175	7-31-89	2:10p	UFGA8401	PN8	261	7-31-89	2:10p

UFGA0112	W86	16131	7-31-89	2:10p	UFGA8401	PNA	189	7-31-89	2:10p
UFGA0310	W76	6989	7-31-89	2:10p	UFGA8401	PNB	4896	7-31-89	2:10p
UFGA7601	PN5	313	7-31-89	2:10p	UFGA8601	PN5	625	7-31-89	2:10p
UFGA7601	PN6	79	7-31-89	2:10p	UFGA8601	PN6	79	7-31-89	2:10p
UFGA7601	PN8	131	7-31-89	2:10p	UFGA8601	PN8	261	7-31-89	2:10p
UFGA7601	PNA	95	7-31-89	2:10p	UFGA8601	PNA	189	7-31-89	2:10p
UFGA7601	PNB	1374	7-31-89	2:10p	UFGA8601	PNB	3175	7-31-89	2:10p
UFGA7901	PN5	625	7-31-89	2:10p	WTH	DIR	386	7-31-89	2:10p
UFGA7901	PN6	53	7-31-89	2:10p	SETUP	FLE	66	7-31-89	2:10p

Directory \DSSAT\MODEL\SOYBEAN

GRO	EXE	136494	7-31-89	2:10p	DATA	<DIR>		7-31-89	2:10p

Directory \DSSAT\MODEL\SOYBEAN\DATA

CROPPARM	SB0	2945	7-31-89	2:10p	UFGA7801	SB8	261	7-31-89	2:10p
GENETICS	SB9	13778	7-31-89	2:10p	UFGA7801	SBA	175	7-31-89	2:10p
GLABEL	DAT	1069	7-31-89	2:10p	UFGA7801	SBB	3034	7-31-89	2:10p
GLABEL2	DAT	784	7-31-89	2:10p	UFGA7801	SBC	1447	7-31-89	2:10p
GLABEL4	DAT	512	7-31-89	2:10p	UFGA7901	SB5	627	7-31-89	2:10p
INTRO	DAT	1914	7-31-89	2:10p	UFGA7901	SB6	148	7-31-89	2:10p
IUCA0109	W79	12082	7-31-89	2:10p	UFGA7901	SB8	261	7-31-89	2:10p
IUCA7901	SB5	1253	7-31-89	2:10p	UFGA7901	SBA	175	7-31-89	2:10p
IUCA7901	SB6	97	7-31-89	2:10p	UFGA7901	SBB	3811	7-31-89	2:10p
IUCA7901	SB8	521	7-31-89	2:10p	UFGA8101	SB5	937	7-31-89	2:10p
IUCA7901	SBA	349	7-31-89	2:10p	UFGA8101	SB6	590	7-31-89	2:10p
IUCA7901	SBB	16412	7-31-89	2:10p	UFGA8101	SB8	391	7-31-89	2:10p
LL1	LEV	909	7-31-89	2:10p	UFGA8101	SBA	262	7-31-89	2:10p
LLB	LEV	1037	7-31-89	2:10p	UFGA8101	SBB	9072	7-31-89	2:10p
N2	PLT	607	7-31-89	2:10p	UFGA8501	SB5	663	7-31-89	2:10p
N4	PLT	700	7-31-89	2:10p	UFGA8501	SB6	227	7-31-89	2:10p
RLB	LEV	1040	7-31-89	2:10p	UFGA8501	SB8	261	7-31-89	2:10p
SBEXP	DIR	1339	7-31-89	2:10p	UFGA8501	SBA	175	7-31-89	2:10p
SIM	DIR	124	7-31-89	2:10p	UFGA8501	SBB	2943	7-31-89	2:10p
SOYV2	PLT	3732	7-31-89	2:10p	UFQU0112	W79	16131	7-31-89	2:10p
SPROFILE	SB2	23359	7-31-89	2:10p	UFQU7901	SB5	374	7-31-89	2:10p
UFGA0112	W78	16130	7-31-89	2:10p	UFQU7901	SB6	25	7-31-89	2:10p
UFGA0112	W79	16130	7-31-89	2:10p	UFQU7901	SB8	131	7-31-89	2:10p
UFGA0112	W81	16131	7-31-89	2:10p	UFQU7901	SBA	88	7-31-89	2:10p
UFGA0112	W85	16131	7-31-89	2:10p	UFQU7901	SBB	1178	7-31-89	2:10p
UFGA7801	SB5	627	7-31-89	2:10p	WTH	DIR	463	7-31-89	2:10p
UFGA7801	SB6	258	7-31-89	2:10p	SETUP	FLE	66	7-31-89	2:10p

Directory **\DSSAT\MODEL\WHEAT**

WHV2	EXE	162513	7-31-89	2:10p	DATA	<DIR>		7-31-89	2:10p

Directory **\DSSAT\MODEL\WHEAT\DATA**

GENETICS	WH9	6144	7-31-89	2:10p	IFSW7501	WH5	4075	7-31-89	2:10p
GLABEL	DAT	644	7-31-89	2:10p	IFSW7501	WH6	1323	7-31-89	2:10p
GLABEL2	DAT	588	7-31-89	2:10p	IFSW7501	WH7	640	7-31-89	2:10p
GLABEL3	DAT	518	7-31-89	2:10p	IFSW7501	WH8	1820	7-31-89	2:10p
GLABEL4	DAT	512	7-31-89	2:10p	IFSW7501	WHA	1408	7-31-89	2:10p
ICTH0136	W79	78990	7-31-89	2:10p	IFSW7501	WHB	2944	7-31-89	2:10p
ICTH1010	W80	11687	7-31-89	2:10p	IFSW7501	WHD	2560	7-31-89	2:10p
ICTH7902	WH8	384	7-31-89	2:10p	KSAS1010	W81	13408	7-31-89	2:10p
ICTH8001	WH4	74	7-31-89	2:10p	KSAS8101	WH4	222	7-31-89	2:10p
ICTH8001	WH5	582	7-31-89	2:10p	KSAS8101	WH5	1392	7-31-89	2:10p
ICTH8001	WH6	48	7-31-89	2:10p	KSAS8101	WH6	171	7-31-89	2:10p
ICTH8001	WH7	110	7-31-89	2:10p	KSAS8101	WH7	384	7-31-89	2:10p
ICTH8001	WHA	256	7-31-89	2:10p	KSAS8101	WH8	780	7-31-89	2:10p
IFRO1110	W74	11335	7-31-89	2:10p	KSAS8101	WHA	640	7-31-89	2:10p
IFRO7501	WH4	384	7-31-89	2:10p	KSAS8101	WHB	4096	7-31-89	2:10p
IFRO7501	WH5	1920	7-31-89	2:10p	KSAS8101	WHD	1536	7-31-89	2:10p
IFRO7501	WH6	256	7-31-89	2:10p	SIM	DIR	124	7-31-89	2:10p
IFRO7501	WH7	384	7-31-89	2:10p	SPROFILE	WH2	23358	7-31-89	2:10p
IFRO7501	WH8	1040	7-31-89	2:10p	WHEXP	DIR	1024	7-31-89	2:10p
IFRO7501	WHA	896	7-31-89	2:10p	WTH	DIR	309	7-31-89	2:10p
IFSW0504	W75	4416	7-31-89	2:10p	SETUP	FLE	66	7-31-89	2:10p
IFSW7501	WH4	518	7-31-89	2:10p					

Directory **\DSSAT\STRATEGY**

DATA	<DIR>		7-31-89	2:10p	STRATAN	EXE	76969	7-31-89	2:10p
BRUN40	EXE	76816	7-31-89	2:10p	STRATSET	EXE	93109	7-31-89	2:10p
STRAT	BAT	34	7-31-89	2:10p					

Directory **\DSSAT\HISTDATA**

ITIM0112	W74	13537	7-31-89	2:10p	ITIM0112	W80	13574	7-31-89	2:10p
ITIM0112	W75	13537	7-31-89	2:10p	ITIM0112	W81	13537	7-31-89	2:10p
ITIM011	W76	13574	7-31-89	2:10p	ITIM0112	W82	13537	7-31-89	2:10p
ITIM0112	W77	13537	7-31-89	2:10p	ITIM0112	W83	13537	7-31-89	2:10p
ITIM0112	W78	13537	7-31-89	2:10p	ITIM0112	W84	13574	7-31-89	2:10p
ITIM0112	W79	13538	7-31-89	2:10p	ITIM0112	W85	13537	7-31-89	2:10p

Directory **\DSSAT\WGEN**

BRUN40	EXE	76816	7-31-89	2:10p	WGENPAR	EXE	50520	7-31-89	2:10p
COEFF	EXE	13563	7-31-89	2:10p	ITIM7412	WMP	1000	7-31-89	2:10p

ITIM7412	WGP	1177	7-31-89	2:10p	UFGA5822	WMP	1000	7-31-89	2:10p
UFGA5822	WGP	1177	7-31-89	2:10p	WMAKER	BAT	64	7-31-89	2:10p
WGEN	BAT	62	7-31-89	2:10p	WMAKPAR	DIR	97	7-31-89	2:10p
WGENGEN	EXE	69546	7-31-89	2:10p	WMAKRGEN	EXE	70144	7-31-89	2:10p
WGENPAR	DIR	97	7-31-89	2:10p	WMAKRPAR	EXE	48176	7-31-89	2:10p

FLOPPY DISK USERS

Experiment Data Entry Forms A_H

MENUA_H	EXE	236544	7-31-89	2:10p	IXCODE	NTX	13312	7-31-89	2:10p
CODE	DBF	27136	7-31-89	2:10p	IXPROD	NTX	2048	7-31-89	2:10p
INSTITU	DBF	9151	7-31-89	2:10p	PRODUCT	DBF	1978	7-31-89	2:10p
INXSTITU	NTX	4096	7-31-89	2:10p					

Experiment Data Entry Forms I_S

MENUI_S	EXE	278016	7-31-89	2:10p	IXCODE	NTX	13312	7-31-89	2:10p
CODE	DBF	27136	7-31-89	2:10p	IXPROD	NTX	2048	7-31-89	2:10p
INSTITU	DBF	9151	7-31-89	2:10p	PRODUCT	DBF	1978	7-31-89	2:10p
INXSTITU	NTX	4096	7-31-89	2:10p					

Print Experiment Forms

PRNTMDS	EXE	208896	7-31-89	2:10p	IXCODE	NTX	13312	7-31-89	2:10p
CODE	DBF	27136	7-31-89	2:10p	IXPROD	NTX	2048	7-31-89	2:10p
INSTITU	DBF	9151	7-31-89	2:10p	PRODUCT	DBF	1978	7-31-89	2:10p
INXSTITU	NTX	4096	7-31-89	2:10p					

Weather Data Entry

FMCUNIT	DBF	354	7-31-89	2:10p	FORMC2A	DBF	259	7-31-89	2:10p
FORMC	DBF	163	7-31-89	2:10p	INSTITU	DBF	7942	7-31-89	2:10p
FORMC1	DBF	258	7-31-89	2:10p	INXSTITU	NTX	2048	7-31-89	2:10p
FORMC1A	DBF	259	7-31-89	2:10p	WEATHER	EXE	237961	7-31-89	2:10p
FORMC2	DBF	226	7-31-89	2:10p					

DBMS Utilities

CODE	DBF	27136	7-31-89	2:10p	IXCODE	NTX	13312	7-31-89	2:10p
FMCUNIT	DBF	414	7-31-89	2:10p	IXFORMC1	NTX	2048	7-31-89	2:10p
FORMC	DBF	163	7-31-89	2:10p	IXFORMC2	NTX	2048	7-31-89	2:10p
FORMC1	DBF	258	7-31-89	2:10p	IXPROD	NTX	2048	7-31-89	2:10p
FORMC1A	DBF	259	7-31-89	2:10p	LOCATE	EXE	10636	7-31-89	2:10p
FORMC2	DBF	226	7-31-89	2:10p	PRODUCT	DBF	1978	7-31-89	2:10p
FORMC2A	DBF	259	7-31-89	2:10p	TEMP80	DBF	4845	7-31-89	2:10p
INSTITU	DBF	9151	7-31-89	2:10p	TEMPC1	DBF	512	7-31-89	2:10p

INXSTITU	NTX	4096	7-31-89	2:10p	UTIL	EXE	240465	7-31-89	2:10p

MDS Retrieval for Crop Models

INSTITU	DBF	9151	7-31-89	2:10p	RETRIEVE	EXE	236745	7-31-89	2:10p
INXSTITU	NTX	4096	7-31-89	2:10p	TRACE	DBF	161	7-31-89	2:10p

MDS Summary Reposts & Graphics

ATT	BGI	6045	7-31-89	2:10p	IXCODE	NTX	13312	7-31-89	2:10p
CGA	BGI	6029	7-31-89	2:10p	IXPROD	NTX	2048	7-31-89	2:10p
CODE	DBF	27136	7-31-89	2:10p	LITT	CHR	2126	7-31-89	2:10p
DBREPORT	EXE	199379	7-31-89	2:10p	PRODUCT	DBF	1978	7-31-89	2:10p
EGAVGA	BGI	5139	7-31-89	2:10p	TEMP	DAT	10	7-31-89	2:10p
HERC	BGI	5933	7-31-89	2:10p	WEAGRAPH	BAT	128	7-31-89	2:10p
INSTITU	DBF	9151	7-31-89	2:10p	WGRAPH	EXE	61613	7-31-89	2:10p
INXSTITU	NTX	4096	7-31-89	2:10p					

Soil Retrieval for Crop Models

DATAFILE	DBF	66	7-31-89	2:10p	INSTITU	DBF	9151	7-31-89	2:10p
DBF2ASC	EXE	180736	7-31-89	2:10p	INXSTITU	NTX	4096	7-31-89	2:10p
GETSOIL	BAT	128	7-31-89	2:10p	SDB	EXE	72461	7-31-89	2:10p
CODELIB	<DIR>		7-31-89	2:10p					

Directory \CODELIB

COUNTRY	DBF	10752	7-31-89	2:10p	SCSCODES	DBF	41410	7-31-89	2:10p
IXCNTRY	NTX	5120	7-31-89	2:10p	SCSCODES	NTX	18432	7-31-89	2:10p

DSSAT Soil Data Files

PROFHEAD	DBF	71300	7-31-89	2:10p	PROFLAYR	DBF	843244	7-31-89	2:10p

Maize Model-Program Disk

MZV2	EXE	159007	7-31-89	2:10p

Maize Model-Data Disk

FLSC0109	W81	6803	7-31-89	2:10p	IBWA8301	MZ4	228	7-31-89	2:10p
FLSC8101	MZ4	76	7-31-89	2:10p	IBWA8301	MZ5	1408	7-31-89	2:10p
FLSC8101	MZ5	464	7-31-89	2:10p	IBWA8301	MZ6	1792	7-31-89	2:10p
FLSC8101	MZ6	191	7-31-89	2:10p	IBWA8301	MZ7	640	7-31-89	2:10p
FLSC8101	MZ7	194	7-31-89	2:10p	IBWA8301	MZ8	780	7-31-89	2:10p
FLSC8101	MZ8	260	7-31-89	2:10p	IBWA8301	MZA	640	7-31-89	2:10p
FLSC8101	MZA	190	7-31-89	2:10p	IBWA8301	MZB	2304	7-31-89	2:10p
GENETICS	MZ9	3770	7-31-89	2:10p	IBWA8301	MZC	640	7-31-89	2:10p
GLABEL	DAT	644	7-31-89	2:10p	IBWA8301	MZD	768	7-31-89	2:10p

GLABEL2	DAT	588	7-31-89	2:10p	MZEXP	DIR	868	7-31-89	2:10p
GLABEL3	DAT	518	7-31-89	2:10p	SIM	DIR	206	7-31-89	2:10p
GLABEL4	DAT	512	7-31-89	2:10p	SPROFILE	MZ2	23358	7-31-89	2:10p
IBSI0112	W80	9216	7-31-89	2:10p	UFGA0112	W82	16132	7-31-89	2:10p
IBSI0112	W81	13568	7-31-89	2:10p	UFGA8201	MZ4	222	7-31-89	2:10p
IBSI0112	W82	13568	7-31-89	2:10p	UFGA8201	MZ5	1671	7-31-89	2:10p
IBSI0112	W83	13568	7-31-89	2:10p	UFGA8201	MZ6	804	7-31-89	2:10p
IBSI0112	W84	11392	7-31-89	2:10p	UFGA8201	MZ7	1086	7-31-89	2:10p
IBSI0112	W85	14208	7-31-89	2:10p	UFGA8201	MZ8	774	7-31-89	2:10p
IBSI8001	MZ4	128	7-31-89	2:10p	UFGA8201	MZA	570	7-31-89	2:10p
IBSI8001	MZ5	464	7-31-89	2:10p	UFGA8201	MZB	2688	7-31-89	2:10p
IBSI8001	MZ6	128	7-31-89	2:10p	UFGA8201	MZC	1280	7-31-89	2:10p
IBSI8001	MZ7	128	7-31-89	2:10p	UFGA8201	MZD	2176	7-31-89	2:10p
IBSI8001	MZ8	264	7-31-89	2:10p	WTH	DIR	770	7-31-89	2:10p
IBSI8001	MZA	256	7-31-89	2:10p	SETUP	FLE	66	7-31-89	2:10p
IBWA1010	W83	5540	7-31-89	2:10p					

PEANUT Model-PROGRAM Disk

GRO	EXE	139666	7-31-89	2:10p

PEANUT Model-DATA Disk

CROPPARM	PN0	3282	7-31-89	2:10p	UFGA7901	PN8	261	7-31-89	2:10p
GENETICS	PN9	7021	7-31-89	2:10p	UFGA7901	PNA	189	7-31-89	2:10p
GLABEL	DAT	1068	7-31-89	2:10p	UFGA7901	PNB	139	7-31-89	2:10p
GLABEL2	DAT	784	7-31-89	2:10p	UFGA8101	PN5	937	7-31-89	2:10p
GLABEL4	DAT	512	7-31-89	2:10p	UFGA8101	PN6	430	7-31-89	2:10p
INTRO	DAT	1914	7-31-89	2:10p	UFGA8101	PN8	391	7-31-89	2:10p
PNEXP	DIR	1116	7-31-89	2:10p	UFGA8101	PNA	283	7-31-89	2:10p
SIM	DIR	124	7-31-89	2:10p	UFGA8101	PNB	1684	7-31-89	2:10p
SPROFILE	PN2	23359	7-31-89	2:10p	UFGA8101	PNC	2304	7-31-89	2:10p
UFGA0112	W79	16130	7-31-89	2:10p	UFGA8401	PN5	625	7-31-89	2:10p
UFGA0112	W81	16131	7-31-89	2:10p	UFGA8401	PN6	378	7-31-89	2:10p
UFGA0112	W84	16175	7-31-89	2:10p	UFGA8401	PN8	261	7-31-89	2:10p
UFGA0112	W86	16131	7-31-89	2:10p	UFGA8401	PNA	189	7-31-89	2:10p
UFGA0310	W76	6989	7-31-89	2:10p	UFGA8401	PNB	4896	7-31-89	2:10p
UFGA7601	PN5	313	7-31-89	2:10p	UFGA8601	PN5	625	7-31-89	2:10p
UFGA7601	PN6	79	7-31-89	2:10p	UFGA8601	PN6	79	7-31-89	2:10p
UFGA7601	PN8	131	7-31-89	2:10p	UFGA8601	PN8	261	7-31-89	2:10p
UFGA7601	PNA	95	7-31-89	2:10p	UFGA8601	PNA	189	7-31-89	2:10p
UFGA7601	PNB	1374	7-31-89	2:10p	UFGA8601	PNB	3175	7-31-89	2:10p
UFGA7901	PN5	625	7-31-89	2:10p	WTH	DIR	386	7-31-89	2:10p
UFGA7901	PN6	53	7-31-89	2:10p	SETUP	FLE	66	7-31-89	2:10p

Soybean Model-Program Disk

GRO	EXE	136494	7-31-89	2:10p

Soybean Model-Data Disk

CROPPARM	SB0	2945	7-31-89	2:10p	UFGA7801	SB8	261	7-31-89	2:10p
GENETICS	SB9	13778	7-31-89	2:10p	UFGA7801	SBA	175	7-31-89	2:10p
GLABEL	DAT	1069	7-31-89	2:10p	UFGA7801	SBB	3034	7-31-89	2:10p
GLABEL2	DAT	784	7-31-89	2:10p	UFGA7801	SBC	1447	7-31-89	2:10p
GLABEL4	DAT	512	7-31-89	2:10p	UFGA7901	SB5	627	7-31-89	2:10p
INTRO	DAT	1914	7-31-89	2:10p	UFGA7901	SB6	148	7-31-89	2:10p
IUCA0109	W79	12082	7-31-89	2:10p	UFGA7901	SB8	261	7-31-89	2:10p
IUCA7901	SB5	1253	7-31-89	2:10p	UFGA7901	SBA	175	7-31-89	2:10p
IUCA7901	SB6	97	7-31-89	2:10p	UFGA7901	SBB	3811	7-31-89	2:10p
IUCA7901	SB8	521	7-31-89	2:10p	UFGA8101	SB5	937	7-31-89	2:10p
IUCA7901	SBA	349	7-31-89	2:10p	UFGA8101	SB6	590	7-31-89	2:10p
IUCA7901	SBB	16412	7-31-89	2:10p	UFGA8101	SB8	391	7-31-89	2:10p
LL1	LEV	909	7-31-89	2:10p	UFGA8101	SBA	262	7-31-89	2:10p
LLB	LEV	1037	7-31-89	2:10p	UFGA8101	SBB	9072	7-31-89	2:10p
N2	PLT	607	7-31-89	2:10p	UFGA8501	SB5	663	7-31-89	2:10p
N4	PLT	700	7-31-89	2:10p	UFGA8501	SB6	227	7-31-89	2:10p
RLB	LEV	1040	7-31-89	2:10p	UFGA8501	SB8	261	7-31-89	2:10p
SBEXP	DIR	1339	7-31-89	2:10p	UFGA8501	SBA	175	7-31-89	2:10p
SIM	DIR	124	7-31-89	2:10p	UFGA8501	SBB	2943	7-31-89	2:10p
SOYV2	PLT	3732	7-31-89	2:10p	UFQU0112	W79	16131	7-31-89	2:10p
SPROFILE	SB2	23359	7-31-89	2:10p	UFQU7901	SB5	374	7-31-89	2:10p
UFGA0112	W78	16130	7-31-89	2:10p	UFQU7901	SB6	25	7-31-89	2:10p
UFGA0112	W79	16130	7-31-89	2:10p	UFQU7901	SB8	131	7-31-89	2:10p
UFGA0112	W81	16131	7-31-89	2:10p	UFQU7901	SBA	88	7-31-89	2:10p
UFGA0112	W85	16131	7-31-89	2:10p	UFQU7901	SBB	1178	7-31-89	2:10p
UFGA7801	SB5	627	7-31-89	2:10p	WTH	DIR	463	7-31-89	2:10p
UFGA7801	SB6	258	7-31-89	2:10p	SETUP	FLE	66	7-31-89	2:10p

Wheat Model-Program Disk

WHV2	EXE	162513	7-31-89	2:10p

Wheat Model-Data Disk

GENETICS	WH9	6144	7-31-89	2:10p	IFSW7501	WH5	4075	7-31-89	2:10p
GLABEL	DAT	644	7-31-89	2:10p	IFSW7501	WH6	1323	7-31-89	2:10p
GLABEL2	DAT	588	7-31-89	2:10p	IFSW7501	WH7	640	7-31-89	2:10p
GLABEL3	DAT	518	7-31-89	2:10p	IFSW7501	WH8	1820	7-31-89	2:10p
GLABEL4	DAT	512	7-31-89	2:10p	IFSW7501	WHA	1408	7-31-89	2:10p
ICTH0136	W79	78990	7-31-89	2:10p	IFSW7501	WHB	2944	7-31-89	2:10p
ICTH1010	W80	11687	7-31-89	2:10p	IFSW7501	WHD	2560	7-31-89	2:10p

ICTH7902	WH8	384	7-31-89	2:10p	KSAS1010	W81	13408	7-31-89	2:10p
ICTH8001	WH4	74	7-31-89	2:10p	KSAS8101	WH4	222	7-31-89	2:10p
ICTH8001	WH5	582	7-31-89	2:10p	KSAS8101	WH5	1392	7-31-89	2:10p
ICTH8001	WH6	48	7-31-89	2:10p	KSAS8101	WH6	171	7-31-89	2:10p
ICTH8001	WH7	110	7-31-89	2:10p	KSAS8101	WH7	384	7-31-89	2:10p
ICTH8001	WHA	256	7-31-89	2:10p	KSAS8101	WH8	780	7-31-89	2:10p
IFRO1110	W74	11335	7-31-89	2:10p	KSAS8101	WHA	640	7-31-89	2:10p
IFRO7501	WH4	384	7-31-89	2:10p	KSAS8101	WHB	4096	7-31-89	2:10p
IFRO7501	WH5	1920	7-31-89	2:10p	KSAS8101	WHD	1536	7-31-89	2:10p
IFRO7501	WH6	256	7-31-89	2:10p	SIM	DIR	124	7-31-89	2:10p
IFRO7501	WH7	384	7-31-89	2:10p	SPROFILE	WH2	23358	7-31-89	2:10p
IFRO7501	WH8	1040	7-31-89	2:10p	WHEXP	DIR	1024	7-31-89	2:10p
IFRO7501	WHA	896	7-31-89	2:10p	WTH	DIR	309	7-31-89	2:10p
IFSW0504	W75	4416	7-31-89	2:10p	SETUP	FLE	66	7-31-89	2:10p
IFSW7501	WH4	518	7-31-89	2:10p					

Crop Model Graphics Program

BRUN40	EXE	76816	7-31-89	2:10p	MAIN	EXE	11721	7-31-89	2:10p
GRPH	EXE	51623	7-31-89	2:10p	NEWPLT	EXE	93712	7-31-89	2:10p
HVGRF	EXE	17215	7-31-89	2:10p					

Appendix C
CONFIG.SYS & AUTOEXEC.BAT

The following examples use the DOS text line editor, EDLIN, to create/edi the CONFIG.SYS and AUTOEXEC.BAT file. It assumes that the EDLIN.COM program is available in your system. For detailed informatio on EDLIN, please refer to your DOS manual.

CREATE/ EDIT CONFIG.SYS

Create CONFIG.SYS

1. At the DOS system prompt, type 'EDLIN CONFIG.SYS'.
2. At the '*', type 'I' and press the <ENTER> key.
3. Enter the following statements after each asterisk.
   1: *FILES = 20
   2: *BUFFERS = 10
   3: *DEVICE = ANSI.SYS
4. To stop the input, press <CTRL><C> at line 4.
5. An asterisk will be shown on screen again, enter 'E' to save the input.

Edit CONFIG.SYS

1. At DOS system prompt, type 'EDLIN CONFIG.SYS'.
2. At the '*', type 'L' and press the <ENTER> key.
3. A list of statements in the CONFIG.SYS will be listed on screen. At the '*', type '<n>I' where <n> is the number of the next available line to input. For example,
   1: *FILES = 20
   2: *BUFFERS = 10
*3I
4. When the new line number appears, follow step 3 to 5 in CREATE CONFIG.SYS.

CREATE/ EDIT AUTOEXEC.BAT

Create AUTOEXEC.BAT

1. At DOS system prompt, type 'EDLIN AUTOEXEC.BAT'.
2. At the '*', type 'I' and press the <ENTER> key.
3. Enter the following statement after the asterisk.
   1: *PATH C:\DSSAT;C:\DSSAT\MODEL\GRAPH
4. To stop the input, press <CTRL><C> at line 2.
5. An asterisk will be shown on screen again, enter 'E' to save the input.

Edit AUTOEXEC.BAT

1. At DOS system prompt, type 'EDLIN AUTOEXEC. BAT'.
2. At the '* ', type 'L' and press the <ENTER> key.
3. A list of statements in the AUTOEXEC.BAT will be listed on the screen.

If a PATH statement already existed in the file, modify it by entering the line number for that statement at the '*' prompt. The PATH statement will again be displayed on the screen with a blank line listed below it. Enter the content of the original PATH statement in the blank line and attach the DSSAT paths at the end. For example,

```
1: *PATH C:\DOS; D:\DBPLUS
2: PROMPT $P$G
*1
1: PATH C:\DOS; D:\DBPLUS
1: PATH C:\DOS; D:\DBPLUS; C:\DSSAT; C:\DSSAT\STRATEGY
```

If there is no PATH statement in the file, type '<n>I' at the '*' prompt. Note that <n> is the number of the next available line to input. For example,

```
1: *PROMPT $P$G
*2I
2: PATH C:\DSSAT; C:\DSSAT\STRATEGY
```

4. Follow steps 4 and 5 in CREATE AUTOEXEC.BAT.

Table of Contents
EXPERIMENT DATA ENTRY

CHAPTER 1
INTRODUCTION

PROGRAM DESCRIPTION

The Experiment Data Entry program allows users to input into DSSAT the experiment data recorded in the Minimum Data Set (MDS) Forms A-S (see IBSNAT TR1, 3rd ed.). With the Experiment Data Entry programs, you may enter, edit, and print experiment data for Forms A-S, except for Forms C-1 and C-2 (see *DSSAT User's Guide–Weather Data Entry*).

The Experiment Data Entry program is composed of three sections:

EXPERIMENT FORMS A-H. This program allows you to access MDS experiment data in Forms A-H. You can enter new experiment data, and edit, delete, or display existing experiment data.

EXPERIMENT FORMS I-S. This program allows you to access MDS experiment data in Forms I-S. You can enter new experiment data, and edit, delete, or display existing experiment data.

PRINT EXPERIMENT FORMS A-S. This program allows you to print MDS experiment data in Forms A-S format, excluding Form C. You can elect to print any or all of the forms.

PREPARE EXPERIMENT DATA STORAGE LOCATION

An experiment data set stored in DSSAT is one of a collection of data base files. These files can be stored either in a subdirectory in your hard disk or on a floppy disk. For a hard-disk system, no special preparation is required. The Experiment Data Entry program will create the necessary experiment data subdirectory for the experiment data set.

To store the files on a disk, prepare an EXPERIMENT DATA disk using the following procedures.

1. Format a blank disk. Refer to the FORMAT command in your IBM DOS manual.

2. Label the disk EXPERIMENT DATA (version 2.1) and include the Institute ID, Site ID, crop code, year of the experiment, and experiment number

(see Chapter 2 for descriptions of IDs). For example,

EXPERIMENT DATA (V 2.1)
IB
WA
83
01
MZ

PROCEDURE FOR SENDING EXPERIMENT DATA TO IBSNAT

IBSNAT requests that collaborators send their experiment data to IBSNA headquarters in both disk and hard-copy form. The procedure for sendin the data are as follows.

1. Make a copy of the Experiment Data disk and a copy of the completed Forms A-S found in IBSNAT TR1, 3rd ed. Keep the originals for your ow records.

2. Label the copy disks with the Institute ID, site ID, crop code, year of experiment, and experiment number (see Chapter 2 for descriptions of ID

3. Mail the copies of Forms and the Experiment Data disk to:

IBSNAT Project
University of Hawaii
2500 Dole Street, Krauss Hall 18
Honolulu, HI. 96822
U.S.A.

Disks should be packed in a rigid, sturdy envelope or box for mailing.

Chapter 2
DATA ENTRY GUIDELINES

This chapter covers general data entry, basic commands and guidelines, tips on how to use the Experiment Data Entry programs, a procedure to enter new codes, and error messages.

TERMINOLOGY

Form. This term is used to refer to Experiment Data Entry input forms (see IBSNAT TR1, 3rd ed. for hard-copy version of these forms). Each form is made up of one or more records and contains different types of data.

- Descriptive Information - Forms A, B, D, E, and H.
- Management Record (Data) - Forms F, G, K, M, N, O and P.
- Response Data - Forms C, I, J, Q, R and S which measure weather, soil, and crop observations.

Record. A single record is usually associated with a single day's data for Response Data and Management Record (Data) forms, but for Descriptive Information forms, one record is equivalent to one form.

SPECIAL KEYS AND KEYSTROKES

This is a summary list of the special keys and keystrokes used throughout this program. For more detailed information about these key/keystrokes with reference to a specific data input form, press the <F1> key while accessing a data input form.

<CTRL><W>	-	SAVE current records and EXIT
<ESC>	-	ABORT accessing a form and go to next form
<F1>	-	Get HELP information
<↑>	-	Go to the PREVIOUS FIELD
<ENTER>	-	Go to the NEXT FIELD
<CTRL><PgUp>	-	Go to the PREVIOUS RECORD
<CTRL><PgDn>	-	Go to the NEXT RECORD
<PgUp>	-	Go to the PREVIOUS PAGE
<PgDn>	-	Go to the NEXT PAGE
<CTRL><Home>	-	Enter COMMENTS

GUIDELINES

1. Experiment data items highlighted in RED for color monitors and marked with an asterisk are REQUIRED DATA for running the IBSNAT crop models. All other data items of the MDS that are NOT in red and dc not have an asterisk next to them represent the data required for validatir the IBSNAT crop models, documenting the experiment, and recording other important conditions for model testing.

Note that soil model inputs, however, are partially derived from a soil dat base which is not described in this document; see the *DSSAT User's Guide Soil Data Retrieval for Crop Models*.

2. When storing experiment data on EXPERIMENT DATA disk or in a subdirectory, only ONE experiment may be stored per disk or directory.

3. When entering experiment data, and after inputting information/data, you must press the <ENTER> key.

4. For missing or unavailable NUMERIC data, enter the value '-9,' except Form C where you enter '-99'.

5. For descriptive information that is missing, press the <ENTER> key to leave the space blank.

MEMORY REQUIRE-MENTS

The Experiment Data Entry programs require approximately 500K of free RAM.

If you do NOT have the required amount of memory and you try to execut the program, you will get a "System memory fault" error.

If you have a 640K machine and executing the program still causes a "System memory fault" to occur, check if you are loading any memory resident drivers or programs. These memory resident programs may be using the RAM needed by the Experiment Data programs.

PLOTS/ RECORDS

For forms in which more than one plot can be entered per record, there is a limitation on the number of plots per record that may be entered because of the limited number of lines on the display screen.

Form	Plots/Record
I	48
J	45
K	65
M	40
N	52
O	60
P	65
Q	65
R-1	65
S	48

If it becomes necessary to enter more plots than a particular form can hold in a single record for any particular date, you may use another separate record with the same date to continue entering the plots.

SAVING RECORDS

The Experiment Data Entry program was designed to save experiment data records after 8 or 10 (depending on the form) records have been entered. After the records have been saved, the program will clear out its memory fields and the data entry process can continue. Because of this, the user will NOT be able to go back, using the <PgUp> key, to records that have been previously saved.

If you wish to change any records that have previously been saved, you may use the "Edit Data" option on the Data Form menu (See Chapter 7 in this User's Guide for instructions).

Chapter 3
START EXPERIMENT DATA ENTRY PROGRAMS

EXECUTE EXPERIMENT DATA ENTRY PROGRAMS

Hard-disk Users

To access the Experiment Data Entry program from the DSSAT shell, select "E Data Entry" from the DBMS main menu and open the Data Entry menu. From the Data Entry menu, select:

"A Experiment Forms A-H" to enter data for Form A-H, except Form C (instructions for Form C are in the *DSSAT User's Guide–Weather Data Entry*).

"I Experiment Forms I-S" to enter data for Form I-S.

"P Print Experiment Forms" to print experiment data forms.

Floppy-disk Users

The procedures to access the Experiment Data Entry program are as follows.

To enter data for Form A-H except Form C (instructions for Form C are in the *DSSAT User's Guide-Weather Data Entry*), do the following.

Insert the "Experiment Data Entry Forms A-H" disk in drive A. At the DOS prompt A>, type MENUA_H and then press the <ENTER> key.

To enter data for Form I-S, do the following.

Insert the "Experiment Data Entry Forms I-S" disk in drive A. At the DOS prompt A>, type MENUI_S and then press the <ENTER> key.

To print experiment data forms, do the following.

Insert the "Print Experiment Data Forms" disk in drive A. At the DOS prompt A>, type PRNTMDS and then press the <ENTER> key.

While the program is processing, DO NOT remove the program disk from the drive unless instructed.

NOTE: All areas where users must enter a response are highlighted on the screen. Press the <ENTER> key to complete an entry.

INTRO-DUCTION SCREEN

The following screen gives a brief introduction on the use of Experiment Forms A-H and Forms I-S. Please note that the information required for crop models is marked with an asterisk and highlighted in red on color display monitors.

DBMS - EXPERIMENT DATA ENTRY **Version 2.1**

USE OF MDS WITH IBSNAT CROP MODELS

The data in the MDS that are indicated with an asterisk and displayed in red on the screen represent required inputs for running current IBSNAT crop models. All other data represent data for validating the IBSNAT crop model, for documenting the experiment, or for recording other important conditions of the experiment.

Press any key to continue

DBMS - EXPERIMENT DATA ENTRY **Version 2.1**

Exp Master List

MAIZE IB WA 83 1

Currently Selected MDS

Drv & Path.........> C:\MAIZE\IB\WA\83\01

Exp. ID................> IB WA 83 1
Institute..............> International Benchmark Sites
> Network for Agrotechnology Transfer

Country..............> U.S.A.

Experiment ....> Maize cultivar by applied nitrogen
description.........> fertility experiment cultivars are
> X304C and H610

Messages

<ENTER>	=	Continue with currently selected MDS.
<F1>	=	For help.
<F2>	=	Select Experiment by entering the drive and path of the data.
<F3>	=	Create New Experiment Data Set.
<ESC>	=	Return to previous menu.

This screen has three main windows. In the left window, "Exp Master Lis shows all the experiment data sets available in DSSAT. The top right window displays information on an experiment data set highlighted in thı "Exp Master List." The bottom right window shows the key options avail able while in this screen.

EXPERIMENT SELECTION

Select a data set from the "Exp Master List," or create a new data set, or enter the drive and path where the existing data set is located.

HARD-DISK USERS

To create a new experiment data set, do the following.

1. Press the <F3> key. Enter the drive and pathname where you want the experiment data set stored (see 'Drive' and 'Pathname' below). The program will create an experiment data set directory and ID file; the message "Creating new experiment..." will appeaı on the screen.

2. Enter the five identification key codes (see section below entitled "Identification Key Codes") when prompted.

To select an experiment data set from the "Exp Master List," do the following.

Highlight the desired data set by using the cursor movement keys and press the <ENTER> key. If no experiment data set filenames are in the DSSAT master list, the message [NO ITEMS IN LIST] will be displayed.

To select a data set by entering the drive and path, do the following.

Press the <F2> key. Enter the drive and pathname where an existing experiment resides.

DRIVE: The letter representing the drive where the experiment data are located (e.g., 'A').

PATHNAME: The pathname of the subdirectory where the experiment data are located. If you are not using subdirectories, then enter '\' for the root directory (e.g., '\' refers to the root directory; '\DATA' refers to the subdirectory DATA). If you are not sure what a pathname is, refer to your DOS manual.

Floppy-disk Users

To create a new experiment, do the following.

1. Insert the EXPERIMENT DATA disk into an available drive. Press the <F3> key.

2. Enter the drive and pathname where you want the experiment data set stored (see 'Drive' and 'Pathname' in the "Hard-disk Users"section above). The program will create an experiment data set directory and ID file; the message "Creating new experiment..." will appear on the screen.

3. Enter the five identification key codes (see following section, "Identification Key Codes" when prompted).

To select an experiment, do the following.

1. Insert the EXPERIMENT DATA disk into an available drive. Press the <F2> key.

2. Enter the drive and pathname where the data set is located (see 'Drive' and 'Pathname' in the "Hard-disk Users" section above

NOTE: The "Exp Master List" shown in the left window of the example screen will display the message [NO ITEMS IN LIST].

IDENTIFICATION KEY CODES

In the DBMS, the Minimum Data Set (MDS) for each experiment is stored and retrieved by a sequence of the following five identifications. Enter these ID codes when prompted.

Institute ID. A unique two-character ID code assigned by IBSNAT to identify collaborator's institutes. A listing of these codes is given in the Appendix of TR1, 3rd ed. If your institute is not listed there, use code '99'. IBSNAT will assign and send you an ID code at a later date.

Site ID. This ID is selected by the collaborator and should reflect the general area of the experiment. If a previous experiment at the same site is already part of the DSSAT data base, the same Site ID should be used.

Experiment Number. This number is selected by the collaborator and should distinquish between experiments done on the same site. For example, the first experiment done at a site could be numbered experiment #1 and each successive experiments numbered accordingly. (Experiments at the same site must have the SAME reference pedon number).

Year of Experiment. This is the last two digits of the year (i.e., for 1987, you would use '87').

Crop Code. This unique two-character code indicates what crop was used in the experiments (see Chapter 2 in the *DSSAT User's Guide-Installation* for a listing of the crop codes).

DBMS - EXPERIMENT DATA ENTRY **Version 2.1**

* INSTITUTE ID	:	IB
* SITE ID	:	WA
* EXPERIMENT NO.	:	01
* YEAR of EXP.	:	83
* CROP CODE	:	MZ

The five IDs of an experiment are displayed. This screen will appear if you are creating a new data set and have pressed the <F3> key.

UPGRADE A FILE TO VERSION 2.1

If the experiment data set you selected was created with version 1.1 of the Experiment Data Entry program, the following error message will appear.

> Error!
>
> Invalid MDS data set version. You are not using a data set compatible with version 2.1. Use the Utilities program to upgrade your data files.

You may choose another experiment data set or quit the Experiment Data Entry program. If you want to upgrade the version 1.1 data set to version 2.1, quit the program, execute the "Utilities" program and select "V Upgrade Minimum Data Set to Version 2.1 Format" from the Utilities main menu (see *DSSAT User's Guide–Utilities*). When the experiment data set has been upgraded to version 2.1, execute the Experiment Data Entry program and select the same experiment data set, now stored in 2.1 format.

CHAPTER 4
EXPERIMENT DATA ENTRY FORMS A-H

This chapter presents and briefly describes all screens presented when you execute the Experiment Data Entry Forms A–H program. Highlighted areas on the screens indicate where data may be entered. Press the <ENTER> key after each entry.

NOTE: All data shown on the sample screens in the following sections are from a maize experiment conducted by the IBSNAT Project in 1983-84 at its Waipio site in Hawaii.

DBMS EXPERIMENT DATA ENTRY – FORMS A-H **Version 2.1**

Main Menu

To select: highlight option using the ↑ and ↓ keys and press
the <ENTER> key to select. Red indicates required information.

FORM A - Institutional Information
FORM B - Nearby Long-term Climatic Stations

* FORM D - Experimental Site
* FORM E - Experiment
* FORM F - Experimental Factors and Levels

* FORM H - Experimental Plots

<ESC> to quit

MAIN MENU FOR FORMS A-H

To select a form, move the highlight box up and down using the cursor movement keys until the form you wish to access is highlighted and the press the <ENTER> key. You may also select a form by pressing the lett associated with the desired form. For example, to select Form A, press tl letter 'A'.

Pressing the <ESC> key will quit the input program and the Experiment Selection menu will be presented.

SUBMENU FOR FORMS A-H, EXCEPT F

The submenus for Forms A through H, except F, are the same. The following is a sample submenu screen for Form A.

FORM A – INSTITUTIONAL INFORMATION **Version 2.1**

FORM A – MENU

1) Input Initial Information
2) Edit Information
3) Delete Information
4) Display Information on Screen

Select an action by number:

<F1> for help
<ESC> to quit

Options:

The options for Forms A–H, except F, are described below. The screens and instructions for Forms A–H presented on the following page are the same for each option.

1 - Allows the user to input initial experiment data to a form.
2 - Allows the user to edit existing experiment data in a form.
3 - Allows the user to remove existing experiment data from a form.
4 - Allows the user to display existing experiment data to the screen.

NOTE: Form B allows additional data entries after the initial experiment data have been entered. To enter either initial or additional data for Form B, choose Option 1.

FORM A – INSTITUTIONAL INFORMATION **Version 2.1**

INSTITUTE ID :	IB
Institute name:	International Benchmark Sites Network for Agrotechnology Transfer, Honolulu, Hawaii
Mailing address:	2500 Dole Street, Krauss 22 Honolulu Hawaii 96822
Country:	USA
Telex:	8423 UHBSP HR
Cable:	
Telephone:	(808) 948-6604
E-mail network: address:	

<ESC> to abort; <CTRL><W> to save; <F1> for help.

FORM A INPUT SCREEN

Enter the institute information in the highlighted areas.

FORM B -- NEARBY LONG-TERM CLIMATIC STATIONS **Version 2.1**

INSTITUTE ID: IB Climatic station name: WAIPIO

Address of responsible organization: IBSNAT Project
2500 Dole Street, Krauss 22
Honolulu
Hawaii 96822
USA

Latitude - deg.: 21 min.: 25 Direction (N, S): N

Longitude - deg.: 158 min.: 0 Direction (E, W): W

Elevation (m): 120

<ESC> to abort; <CTRL><W> to save; <PgDn> for next screen; <F1> for help.

FORM B INPUT SCREENS

Because of its length, Form B has two input screens. This screen is the first page of Form B.

FORM B – NEARBY LONG-TERM CLIMATIC STATIONS **Version 2.1**

	YEARS OF RECORD	COMPLETE/INCOMPLETE (C/I)
TMin:	7	C
TMax:	7	C
Precipitation:	7	C
Solar radiation:	7	C
Hours of sunshine:	0	
Percent cloud cover:	0	
Humidity:	7	C
Soil temperature:	7	C
Windrun:	7	C
Rainfall intensity:	0	

<ESC> to abort; <CTRL><W> to save; <PgUp> for previous screen; <F1> for help.

This screen is the second page of Form B.

NOTE: You may enter information for more than one long-term climatic station. When you have finished inputting information for the first, another blank record will be displayed for another station's information. If you have only one station, press the <ESC> key at the blank record to return to the submenu for Forms A–H

FORM D – EXPERIMENTAL SITE **Version 2.1**

INSTITUTE ID: IB SITE ID: WA

Site name:
Waipio

* Pedon no.: **82p736**

Soil series name:
Wahiawa

* Soil classification (Family level of soil taxonomy):
Clayey, kaolinitic, isohyperthermic, Tropeptic Eutrustox

Description of site (Geomorphology or position in landscape):

<ESC> to abort; <CTRL><W> to save; <PgDn> for next screen; <F1> for help.

FORM D INPUT SCREENS

Because of its length, Form D has two input screens. This screen is the first page of Form D.

FORM D – EXPERIMENTAL SITE **Version 2.1**

INSTITUTE ID: IB SITE ID: WA

Natural vegetation:
Grass and shrubby trees

Years in cultivation and past management practice:
40 years in pineapple through 1970
Mainly maize cultivation since 1976

*Latitude - deg.: **21** min.: **25** Direction (N, S) : **N**
*Longitude - deg.: **158** min.: **0** Direction (E, W): **W**

Elevation (m): **120** Weather station ID: **WA**

<ESC> to abort; <CTRL><W> to save; <PgUp> for previous screen; <F1> for help.

This screen is the second page of Form D.

FORM E – EXPERIMENT **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

* Experiment name: Weather station ID: WA
Maize cultivar x applied in trial

* Beginning date (dd/mm/yy): 22/11/83 Ending date (dd/mm/yy): 15/05/84

Experiment description: Maize cultivar by applied nitrogen fertility experiment
Cultivars are x304c and h610
N levels are 0, 50, and 200 N kg/ha

Responsible researchers: Upendra Singh and Patrick Ching

Distance from weather station (m): 50

<ESC> to abort; <CTRL><W> to save; <PgDn> for next screen; <F1> for help.

FORM E INPUT SCREENS Because of its length, Form E has two input screens. This screen is the first page of Form E.

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FORM E - EXPERIMENT **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

* Experiment name:
Maize cultivar x applied N trial

Weather station ID: **WA**

Experimental design: **Randomized complete block design with three replications**
The treatments are factorial treatment combinations of two cultivars and three N levels

Vertical angle from horizontal to the top of hills or other obstructions to sun's rays (deg): **3**

<ESC> to abort; <CTRL><W> to save; <F1> for help; <PgUp> for previous screen.

This screen is the second page of Form E.

SUBMENU FOR FORM F

Form F is different from the other forms in the A-H menu, not only because it is made up of four separate forms, F-1, F-2, F-3, and F-4, but also because there is an additional set of menus associated with these forms.

This is the main submenu for Form F.

FORM F – EXPERIMENTAL FACTORS AND LEVELS **Version 2.1**

FORM F – MENU

1) Input Initial Data
2) Input Additional Data
3) Edit Data
4) Delete Data
5) Display Data on Screen

Select an action by number:

<F1> for help
<ESC>to quit

Options

The options for Form F are described below. The screens and instructions for Options 1 and 2 are presented on the following pages. The screens and instructions for Options 3 and 4 are presented in Chapter 7.

1 - Allows the user to input initial experiment data to Form F.
2 - Allows the user to access the Add menu for Form F and input additional data.
3 - Allows the user to access the Edit menu for Form F and edit experiment data.
4 - Allows the user to access the Delete menu for Form F and delete experiment data.

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5 - Allows the user to display existing Form F to the screen.

Press the <F1> key for on-line HELP information about each option in the menu.

FORM F – EXPERIMENTAL FACTORS AND LEVELS **Version 2.1**

FORM F - ADD MENU

1) Add data to FORM F-1 – Description of Each Factor in the Experiment
2) Add data to FORM F-2 – Description of Each Level for Each Factor
3) Add data to FORM F-3 – Factor and Level Treatment Combinations
4) Add data to FORM F-4 – Treatment and Rep Number for Each Plot

Select an option by number:

<F1> for help
<ESC> to quit

Add Menu

From this menu you can choose to add records to any or all of the Forms F-1, F-2, F-3, or F-4.

Press the <F1> key for on-line HELP information about each option in the menu.

FORM F - EDIT MENU

1) Edit data in FORM F-1 – Description of Each Factor in the Experiment
2) Edit data in FORM F-2 – Description of Each Level for Each Factor
3) Edit data in FORM F-3 – Factor and Level Treatment Combinations
4) Edit data in FORM F-4 – Treatment and Rep Number for Each Plot

Select an option by number:

<F1> for help
<ESC> to quit

Edit Menu

From this menu you can choose to modify records of any or all of the Forms F-1, F-2, F-3, or F-4. (See Chapter 7 for edit screens and instructions.)

Press the <F1> key for on-line HELP information about each option in the menu.

FORM F – EXPERIMENTAL FACTOR AND LEVELS — Version 2.1

FORM F - DELETE MENU

1) Delete the entire FORM F of an experiment
2) Delete data in FORM F-1 – Description of Each Factor in the Experiment
3) Delete data in FORM F-2 – Description of Each Level for Each Factor
4) Delete data in FORM F-3 – Factor and Level Treatment Combinations
5) Delete data in FORM F-4 – Treatment and Rep Number for Each Plot

Select an action by number:

<F1> for help
<ESC> to quit

Delete Menu

From this menu you can choose to delete records from any or all of the Forms F-1, F-2, F-3, or F-4. (See Chapter 7 for delete screens and instructions.)

Press the <F1> key for on-line HELP information about each option in the menu.

FORM F-1 – EXPERIMENTAL FACTORS & LEVELS **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

DESCRIPTION OF EACH FACTOR IN THE EXPERIMENT

FACTOR NAME	DESCRIPTION
FACTOR_A	**applied nitrogen**
FACTOR_B	**cultivar**

** NOTE: The maximum number of factor names you can input is 5.

<ESC> to abort; <CTRL><PgUp> for previous record;
<CTRL><W> to save; <CTRL><PgDn> for next record;
<F1> for help.

FORM F INPUT SCREENS

There are four screens for Form F: F-1, F-2, F-3, and F-4. The above screen is for Form F-1.

FORM F-2 – EXPERIMENTAL FACTORS & LEVELS **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

DESCRIPTION OF EACH LEVEL FOR EACH FACTOR

LEVEL (AMOUNT OR NAME)	DESCRIPTION
0	**no applied nitrogen**
50	**50 kg N/ha**
200	**200 kg N/ha**
H610	**cultivar H610**
X304C	**cultivar X304C**

<ESC> to abort; <CTRL><PgUp> for previous record; <PgUp> for previous screen;
<CTRL><W> to save; <CTRL><PgDn> next record; <PgDn> for next screen;
<F1> for help.

This screen is for Form F-2.

FORM F-3 – EXPERIMENTAL FACTORS & LEVELS **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

FACTOR AND LEVEL TREATMENT COMBINATIONS

TRT NO.	FACTOR_A	FACTOR_B
	———LEVELS (AMOUNTS OR NAMES) FOR EACH FACTOR———	
1	0	X304C
2	50	X304C
3	200	X304C
4	0	H610
5	50	H610
6	200	H610

<ESC> to abort; <CTRL><PgUp> for previous record; <PgUp> for previous screen;
<CTRL><W> to save; <CTRL><PgDn> next record; <PgDn> for next screen;
<F1> for help.

This screen is for Form F-3.

FORM F-4 – EXPERIMENTAL FACTORS & LEVELS **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

TREATMENT AND REP NUMBER FOR EACH PLOT

* PLOT NO.	*TRT NO.	REP NO.
1	1	1
16	1	2
17	1	3
5	2	1
9	2	2
22	2	3
4	3	1
14	3	2
18	3	3
8	4	1
12	4	2
21	4	3
6	5	1

<ESC> to abort; <CTRL><PgUp> previous record; <PgUp> for previous screen;
<CTRL><W> to save; <CTRL><PgDn> next record; <PgDn> for next screen;
<F1> for help.

This screen is for Form F-4.

FORM H – EXPERIMENTAL PLOTS **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

Plot area (m^2):	48	Slope (%):	2
Slope length (m):	100	Aspect (direction):	W
Depth of soil drain (cm):	-9	Distance between drains (m):	-9

* Amt. of weed/crop residue incorporated during land preparation(kg/ha): 2000
* Depth of residual incorporated during land preparation (cm): 30
Was residue burned? (Y/N) N

Specific comments:
The treatments were superimposed over old experimental plots with varying applied P rates. Possibility of residual P effects but doubtful.

<ESC> to abort; <CTRL><W> to save; <PgDn> for next screen; <F1> for help.

FORM H INPUT SCREENS

Because of its length, Form H has two input screens. This is the first page of Form H.

FORM H – EXPERIMENTAL PLOTS **Version 2.1**

INSTITUTE ID: IB   SITE ID: WA   EXPERIMENT NO.: 1

TYPE OF RESIDUE:

CROP	PERCENT (%)	CROP	PERCENT (%)
Other	-9	Aroids	-9
Cassava	-9	Dry broad leaf weeds	-9
Dry grass weeds	80	Dry beans	-9
Green broad leaf weeds	-9	Green Grass weeds	-9
Grain Sorghum	-9	Maize	-9
Peanuts	-9	Potato	-9
Rice	-9	Soybean	-9
Shrubs/trees	20	Wheat	-9

<ESC> to abort; <CTRL><W> to save; <PgUp> for previous screen; <F1> for help.

This is the second page of Form H.

Chapter 5
EXPERIMENT DATA ENTRY FORMS I-S

This chapter presents and briefly describes all screens presented when you execute the Experiment Data Entry Forms I–S program. Highlighted areas on the screens indicate where data may be entered. Press the <ENTER> key after each entry.

NOTE: All data shown on the sample screens in the following sections are from a maize experiment conducted by the IBSNAT Project in 1983-84 at its Waipio site in Maui.

MAIN MENU

To select : highlight option using the ↑ and ↓ keys and press <ENTER> to select.
Red indicates required information.

* FORM I	- Soil Fertility	FORM O -	Biocides and Hormones
* FORM J	- Volumetric Soil Water Contents	* FORM P -	Irrigation
FORM K	- Tillage	FORM Q -	Crop Damage
FORM L	- Cultivars	* FORM R -	Phenological Growth Stage & Harvest Yield Components
* FORM M	- Planting	FORM S -	Plant Nutrient Concentrations
* FORM N	- Fertilizers, Inoculants, & Amendments		

<ESC> to quit

MAIN MENU FOR FORMS I-S

To select a form, move the highlight box up and down using the cursor movement keys until the form you wish to access is highlighted and then press the <ENTER> key. You may also select a form by pressing the letter associated with the desired form. For example, to select Form I, press the letter 'I'.

Pressing the <ESC> key will exit the input program and the Experiment Selection menu will be presented.

SUBMENU FOR FORMS I AND J

Forms I and J have an additional submenu before the usual input program options menu. The following is a sample screen for Form I. The submenu screens for Form J is the same as this one, except that the options are for entering Soil Water Content Preplant and Other data.

FORM I – SOIL FERTILITY **Version 2.1**

FORM I - MENU

1) Preplant Soil Fertility Measurements
2) Other Soil Fertility Measurements

Select an action by number:

<ESC> to quit

Options:

1 - Allows the user to enter experiment PREPLANT Soil Fertility data.
2 - Allows the user to enter experiment OTHER Soil Fertility data.

SUBMENU FORMS I-S

The submenus for Forms I through S are the same. The following screer an example screen (Form I) for these submenus.

FORM I-1 – PREPLANT SOIL FERTILITY MEASUREMENTS **Version 2.1**

F O R M I-1 - M E N U

1) Input Initial/Additional Data
2) Edit Data
3) Delete Data
4) Display all Data on Screen

Select an action by number:

<F1> for help
<ESC> to quit

Options

The options for Forms I-S are described below. The screens and instructions for Option 1 are presented on the following pages. The screens and instructions for Options 2 and 3 are presented in Chapter 7.

1 - Allows the user to input initial experiment data to a form or add additional data.
2 - Allows the user to edit existing experiment data in a form (see Chapter 7).
3 - Allows the user to remove existing experiment data from a form (see Chapter 7).
4 - Allows the user to display existing experiment data to the screen.

Press the <F1> key for on-line HELP information about each option in the menu.

FORM I-1 – PRE-PLANT SOIL FERTILITY MEASUREMENTS **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1
Method of P extraction: **MODIFIED TRUOG**

* DATE dd/mm/yy	*PLOT(S)	*UPPER	*LOWER	——pH—— *H2O	*KCl	*NO3-N	*NH4-N	P	K	Al
		(—cm—)				(——————	g/Mg	——————)		%
18/11/83	1 16 17	0	5	5.2	4.8	4.0	3.0	27.0	-9.0	-9.00
18/11/83	1 16 17	5	15	5.2	4.6	3.0	3.0	25.0	-9.0	-9.00
18/11/83	1 16 17	15	30	5.0	4.3	1.0	2.0	10.0	-9.0	-9.00
18/11/83	1 16 17	30	50	4.8	4.2	1.0	1.0	10.0	-9.0	-9.00
18/11/83	1 16 17	50	70	4.8	4.1	1.0	1.0	5.0	-9.0	-9.00
18/11/89	1 16 17	70	90	4.5	4.0	1.0	1.0	5.0	-9.0	-9.00
18/11/89	1 16 17	90	110	4.5	4.0	1.0	1.0	4.0	-9.0	-9.00
18/11/89	5 9 22	0	5	5.2	4.8	5.0	3.0	27.0	-9.0	-9.00
18/11/89	5 9 22	5	15	5.2	4.8	5.0	2.0	27.0	-9.0	-9.00
18/11/89	5 9 22	15	30	5.0	4.3	1.0	1.0	10.0	-9.0	-9.00
18/11/89	5 9 22	30	50	4.8	4.2	1.0	1.0	10.0	-9.0	-9.00
18/11/89	5 9 22	50	70	4.8	4.1	1.0	1.0	5.0	-9.0	-9.00

<F1> for help

FORM I-1 AND I-2 INPUT SCREENS

The screen for Form I-2 is exactly the same as this one except:

1) The title line has I-2 instead of I-1, and
2) It displays Other Soil Fertility Measurements in place of Preplant Soil Fertility Measurements.
3) Also, I-2 has no required data (i.e., no asterisks and no red).

By pressing the <F1> key, you can get the help screen associated with each of the Forms I-S. A sample HELP screen available for Forms I-S follows.

This screen allows you to input initial data to a form or add records to a form. To stop inputting data records, after entering the last record, press the <ENTER> key while in a blank date field.

NOTE: All commands to go back to previous records apply only to records that have NOT been saved yet.

CURSOR MOVEMENT

< ↑ >	-	move to previous field
<ENTER>	-	move to next field
<CTRL><PgUp>	-	move to previous record
<CTRL><PgDn>	-	move to next record
<PgUp>	-	move to previous page
<PgDn>	-	move to next page
<CTRL><Home>	-	enter COMMENTS for current form
<CTRL><W>	-	save current records
<ESC>	-	abort entry of current record, save previously entered records, and exit

Press any key to continue

Sample Help Screen

In addition to the command keys shown in this screen, other help screen are available in some of the forms. The other screens are field-dependen That is, if you are in a data input field which requires you to input a spe code, you can call up the screen listing of these codes by pressing the <F key while in that field. This is discussed in more detail later in this User Guide.

FORM J-1 – PREPLANT SOIL WATER CONTENTS **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

LAYERS	1	2	3	4	5	6	7
*UPPER (cm)	**0**	**5**	**15**	**30**	**50**	**70**	**90**
*LOWER (cm)	**5**	**15**	**30**	**50**	**70**	**90**	**110**

* DATE dd/mm/yy	* PLOT(S)	* VOLUMETRIC WATER CONTENT IN % FOR LAYER: 1	2	3	4	5	6	7
16/11/83	**99**	**26.0**	**26.0**	**30.0**	**37.0**	**32.0**	**29.0**	**32.0**

<F1> for help

FORM J-1 AND J-2 INPUT SCREENS

The screen for Form J-2 is exactly the same as this one except:

1) The title line has J-2 instead of J-1, and
2) It displays Other Soil Water Contents in place of Preplant Soil Water Contents.
3) Also, J-2 has no required data (i.e. no asterisks and no red).

FORM K – TILLAGE **Version 2.1**

INSTITUTE ID: IB   SITE ID: WA   EXPERIMENT NO.: 1

DATE dd/mm/yy	PLOT(S)	IMP. CODE	DEPTH (cm)	OTHER INFORMATION
10/11/83	99	99	0	cut and removed dry weeds manually
17/11/83	99	15	15	rototilled with walking tiller
22/11/83	99	99	0	smoothed surface with hand rake
29/11/83	99	15	15	rototilled fertilizer-walking tiller

<F1> for help

FORM K INPUT SCREEN

For a list of the current Implement Codes, place the cursor in the IMP. CODE field and press the <F1> key. If the Code you need is NOT listed, you may add it to the list. Instructions for adding new codes may be four in Chapter 8.

FORM L – CULTIVAR **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

*CULTIVAR NAME	OTHER NAMES	TYPE	SEED WT. / # OF SEEDS (g)	SEED AGE (days)	SPROUT LENGTH(mm)
H610 (UH)		sngl cross	-9.00	-9.0	-9.0
PIO X304C		sngl cross	-9.00	-9.0	-9.0

FORM L
INPUT
SCREEN

FORM M – PLANTING **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

*Method of Planting: **Row Planting**

*PLANTING OR TRANSPLANTING dd/mm/yy	*PLOT(S)	*CULTIVAR	*ROW SPACING (cm)	*PLANT COUNT	*PLANT POP. (pl./m2)	*SEED DEPTH (cm)	IMP. CODE
30/11/83	1 4 5 9 14 16 17 18 22	PIO X304C	75.0	4.4	5.80	5.0	99
30/11/83	3 6 8 10 11 12 19 21 24	H610 (UH)	75.0	4.4	5.80	5.0	99

<F1> for help

FORM M INPUT SCREEN

For a list of the current Implement Codes, place the cursor in the IMP. CODE field and press the <F1> key. If the Code you need is NOT listed, you may add it to the list. Instructions for adding new codes may be foun in Chapter 8.

NOTE: The first time you enter experiment data, the Method of Planting used i the experiment must be entered.

FORM N – FERTILIZERS, INOCULANTS, AND AMENDMENTS Version 2.1

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

*DATE dd/mm/yy	*PLOT(S)	*MAT. CODE	PL. CODE	METHOD CODE	*DEPTH (cm)	*N	P	K	CaCO3	Other
						(kg/ha				)
29/11/83	99	14	2	2	15	0	13	0	0	0
29/11/83	99	16	2	2	15	0	0	100	0	0
29/11/83	5 6 9 10 22 24	5	2	2	15	17	0	0	0	0
29/11/83	3 4 11 14 18 19	5	2	2	15	67	0	0	0	0
06/01/83	5 6 9 10 22 24	5	2	2	15	17	0	0	0	0
06/01/83	3 4 11 14 18 19	5	2	2	15	67	0	0	0	0
10/02/84	5 6 9 10 22 24	5	2	2	15	17	0	0	0	0

<F1> for help

FORM N INPUT SCREEN

For a list of the current Material, Placement, or Method Codes, place the cursor in a CODE field and press the <F1> key. If the Code you need is NOT listed, you may add it to the list. Instructions for adding new codes may be found in Chapter 8.

FORM O – BIOCIDES AND HORMONES **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

DATE dd/mm/yy	PLOT(S)	PROD. CODE	AMOUNT ACT. INGRED. (kg AI/ha)	TARGET
18/11/83	99	1999	1.2	grassy weeds
05/12/83	99	1001	3.0	grasses
05/12/83	99	1999	1.0	broadleaf weeds
06/12/83	99	2999	2.0	cutworms
20/12/83	99	2999	1.0	rose beetles
08/03/84	99	3003	3.5	common rust
12/03/84	99	2006	1.0	red spider mite

<F1> for help

FORM O INPUT SCREEN

For a list of the current Product Codes, place the cursor in the PROD.COI field and press the <F1> key. If the Code you need is NOT listed, you ma add it to the list. Instructions for adding new codes may be found in Chapter 8.

FORM P – IRRIGATION **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

* DATE dd/mm/yy	* PLOT(S)	* AMOUNT (mm)	METHOD CODE
03/12/83	99	43	5
05/12/83	99	22	5
07/12/83	99	18	5
16/12/83	99	8	5
21/12/83	99	11	5
23/12/83	99	6	5
30/12/83	99	6	5
06/01/84	99	6	5
09/01/84	99	6	5
13/01/84	99	5	5
19/01/84	99	5	5
20/01/84	99	5	5
26/01/84	99	19	5

<F1> for help

FORM P INPUT SCREEN

For a list of the current Method Codes, place the cursor in the METHOD CODE field and press the <F1> key. If the Code you need is NOT listed, you may add it to the list. Instructions for adding new codes may be found in Chapter 8.

FORM Q – CROP DAMAGE **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

DATE dd/mm/yy	PLOT(S)	TYPE OF DAM. CODE	TISSUE DAM. CODE	% PLANT LOSS	% NECROTIC AREA
07/12/83	99	0	0	0	0
		Comments:	50 % emergence - no visible signs of damage		
21/12/83	99	0	0	0	0
		Comments:	very few weeds, borders slightly damaged by rose beetles		

<F1> for help

FORM Q INPUT SCREEN

For a list of the current Type of Damage or Tissue Damage Codes, place th cursor in the corresponding CODE field and press the <F1> key. If the Code you need is NOT listed, you may add it to the list. Instructions for adding new codes may be found in Chapter 8.

SUBMENU FOR FORM R

Form R has an additional submenu before the Forms I–S submenu. This additional submenu allows you to enter data about either the Phenological Growth Stage Components or the Growth Analysis, Harvest and Final Yield Components. You may also enter the program from this submenu.

FORM R– GROWTH STAGE & HARVEST YIELD COMPONENTS Version 2.1

FORM R - MENU

1) Phenological Growth Stage Components
2) Growth Analysis, Harvest, and Final Yield Components

Select an action by number:

<ESC> to quit

Options:

1 - Allows the user to enter experiment data to Form R-1.
2 - Allows the user to enter experiment data to Form R-2.

FORM R-1– PHENOLOGICAL GROWTH STAGE COMPONENTS Version 2.1

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

* DATE dd/mm/yy	* PLOT(S)					GROWTH STAGE * Vegetative	* Reproductive
07/12/83	99					VE	
03/01/84	3	6	8	10	11	V6	
	12	19	21	24			
04/01/84	1	4	5	9	14	V6	
	16	17	18	22			
12/02/84	3	11	19				R1
14/02/84	6	10	24				R1
16/02/84	4	14	18				R1
17/02/84	8	12	21				R1
17/02/84	5	9	22				R1
17/02/84	1	16	17				R1
25/02/84	3	11	19				R2
27/02/84	4	14	18				R2

<F1> for help

FORM R-1 INPUT SCREEN

For a list of the possible Growth Stages, place the cursor in the GROWTH STAGE field and press the <F1> key. If the Growth Stage you need is NOT listed, you may add it to the list. Instructions for adding new codes may be found in Chapter 8.

FORM R-2 –GROWTH ANALYSIS, HARVEST & YIELD COMPONENTS Ver. 2.1

INSTITUTE ID: MA SITE ID: HQ EXPERIMENT NO.: 1

* DATE dd/mm/yy	* PLOT	* GROWTH STAGE Veg.	Repr.	*HARVEST CODE / AMT.					
02/01/84	1	V6		1/	5.79	3/	27.78	13/	1.05
				8/	27.78				
02/01/84	3	V6		1/	5.79	3/	28.11	13/	0.98
				8/	28.11				
02/01/84	4	V6		1/	5.79	3/	20.30	13/	0.88
				8/	20.30				
02/01/84	5	V6		1/	5.79	3/	20.21	13/	0.85
				8/	23.60				
02/01/84	6	V6		1/	5.79	3/	23.60	13/	0.85
				8/	23.60				

<F1> for help

FORM R-2 INPUT SCREEN

For a list of the possible Growth Stages or Harvest Component Codes, place the cursor in the GROWTH STAGE field and press the <F1> key. If the Growth Stage you need is NOT listed, you may add it to the list. Instructions for adding new codes may be found in Chapter 8.

FORM S – PLANT NUTRIENT CONCENTRATIONS **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

DATE dd/mm/yy	PLOT(S)	COMPONENT CODE	NUTRIENT CONCENTRATION N (%)	P (%)	K (%)
18/04/84	1, 16, 17	15	0.91	-9.00	-9.00
18/04/84	3, 11, 19	15	1.54	-9.00	-9.00
18/04/84	4, 14, 18	15	1.52	-9.00	-9.00
18/04/84	5, 9, 22	15	1.00	-9.00	-9.00

<F1> for help

FORM S INPUT SCREEN

For a list of the current Component Codes, place the cursor in the COMPONENT CODE field and press the <F1> key. If the code you need is NOT listed, you may add it to the list. Instructions for adding new codes may be found in Chapter 8.

NOTE: When this form is initially created, the program will prompt for the column headings of the Nutrient Concentrations. From that point on, those column headings will become defaults and will be used when data is entered into this form. If you wish to change the headings, you must delete the whole form and then create it again, entering the new headings that you want for the Nutrient Concentrations.

Chapter 6
PRINT EXPERIMENT DATA FORMS

This chapter describes all screens presented when you execute the Print Experiment Data Forms program.

NOTE: Before you select any forms from the menu, be sure your computer is connected to a printer and the printer is turned on.

DBMS EXPERIMENT DATA ENTRY -- PRINT FORMS A-S **Version 2.1**

PRINT MENU

To select : highlight an option using the ↑ and ↓ keys and press the <ENTER> key to select. Red indicates required information.

FORM A -	Institutional Information	FORM L -	Cultivars
FORM B -	Nearby Long-term Climatic Stations	* FORM M -	Planting
* FORM D -	Experimental Site	* FORM N -	Fertilizers, Inoculants, & Amendments
* FORM E -	Experiment	FORM O -	Biocides and Hormones
* FORM F -	Experimental Factors and Levels	* FORM P -	Irrigation
* FORM H -	Experimental Plots	FORM Q -	Crop Damage
* FORM I -	Soil Fertility	* FORM R -	Phenological Growth Stage & Harvest Yield Components
* FORM J -	Volumetric Soil Water Contents	FORM S -	Plant Nutrient Concentrations
FORM K -	Tillage	Y -	Print ALL Forms

<ESC> to quit

MAIN MENU FOR PRINT PROGRAM

To select a form, move the highlight box up and down using the cursor movement keys until the form you wish to access is highlighted and then press the <ENTER> key. You may also select a particular form by pressing the letter associated with the form you wish to access. For example, to select Form I, press the letter 'I'.

Pressing 'Y' will print ALL forms that have any data in them.

Pressing the <ESC> key will exit the print program and return to the "Experiment Selection" menu.

Chapter 7
EDIT/DELETE RECORDS

This chapter describes the procedures for editing and deleting specific records from Forms I–S. Because the records in each of these forms are associated with a key field, it is necessary to select the appropriate key (see following list) when editing or deleting records.

Forms	Key Field
F-1	Factor code
F-2	Level code
F-3	Treatment
F-4	Plots
I-K, M-S	Date
L	Cultivar

FORM I-1– PREPLANT SOIL FERTILITY MEASUREMENTS Version 2.1

FORM I-1 – MENU

1) Input Initial/Additional Data
2) Edit Data
3) Delete Data
4) Display All Data on Screen

Select an action by number:

<F1> for help
<ESC> to quit

EDIT PROCEDURES

1. Select Option 2, "Edit Data," from the selected form's Edit/Delete menu. (See example menu screen on previous page.)

FORM I-1 – PREPLANT SOIL FERTILITY MEASUREMENTS **Version 2.1**

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

Method of P extraction: **Modified Truog**

2. Forms I-1, I-2, J, M, and S have titled items (e.g, "Method of P extraction" in the above screen). When editing these forms records, these items may be changed.

If you DO NOT wish to edit the titled item, press the <ENTER> key.

If you DO want to edit the titled item, type in the changes and press the <ENTER> key when finished.

FORM I-1 – PREPLANT SOIL FERTILITY MEASUREMENTS Version 2.1

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

Method of P extraction: **Modified Truog**

The following are the dates for which information currently exists in the file. Use ↑ and ↓ keys to select the date to be changed (<ESC> to quit).

18/11/83 18/11/83 18/11/83 18/11/83
18/11/83

Upper	Lower	H2O	KCL	NO3	NH4	P	K	AL
0	5	5.2	4.8	4	3	27	-9	-9.00

Key Field Menu

3. A list of the key fields associated with records currently in the data base for the form being edited will be displayed. In the above screen, the key field for Form I-1 is any date.

At the bottom of the screen, the record and data associated with the selected date will be displayed to help in selecting the record you want to edit.

To select a date, move the cursor using the cursor movement arrow keys until the date you want to edit is highlighted, and then press the <ENTER> key.

FORM I-1 – PREPLANT SOIL FERTILITY MEASUREMENTS Version 2.1

INSTITUTE ID: IB SITE ID: WA EXPERIMENT NO.: 1

Method of P extraction: **Modified Truog**

*DATE dd/mm/yy	*PLOT(S)	*UPPER (——cm	*LOWER ——)	——pH—— *H2O	*KCl	*NO3-N (————	*NH4-N g/Mg	P	K ———)	Al %
18/11/83	99	0	5	5.2	4.8	4	3	27	-9	-9.0

4. The selected record will be displayed and may be edited.

Note that "going off" the last field (ie. Al) on the right causes the cursor to "loop around" and return to the first field (DATE) on the left. You may move to the next data field by pressing the <ENTER> key and move back to the previous data field by using the ↑ key.

You must press the <ENTER> key after changing an item.

To STOP editing a record, press the <ESC> key and the Key Field menu will be presented.

NOTE: For the other forms (Forms J–S), the editing procedures described for Form I–1 are exactly the same except that the key field may vary.

DELETION PROCEDURES

1. Select Option 3, "Delete Data," from the selected form's Edit/Delete-menu.

2. The following submenu will be displayed. Select Option 2.

NOTE: If you wish to delete an entire form with all its records, select Option 1. In this case, you will not follow these deletion procedures, but the instructions on screen which will follow an Option 1 selection.

FORM I–1 -- PREPLANT SOIL FERTILITY MEASUREMENTS **Version 2.1**

FORM I–1 - DELETE MENU

1) Delete the Whole Form of an Experiment
2) Delete Data for One Day

Select an action by number:

<F1> for help
<ESC> to quit

3. The deletion procedure is the same as the edit procedure and key fields are used. However, instead of editing the fields after you have selected a date, the selected record will be displayed and you will be prompted to delete the record.

Type 'Y' to delete the selected record.

Type 'N' to keep the record.

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4. The key selection menu will be displayed again and you may either select another record to delete or press the <ESC> key to exit to the previous menu.

CHAPTER 8
ADD/DELETE CODES

This chapter describes the procedures for adding new codes to and deleting existing codes from the Experiment Data Entry program code files.

NOTE: The code deletion procedure will only allow deletion of codes added by the user. Codes that originally existed in the code files CANNOT be deleted.

PROCEDURES TO ADD A NEW CODE

When you want to add codes to an MDS form that allows user-entered codes, do the following.

1. Place the cursor within the code field where you want to add codes.

2. Press the <F1> key.

3. Press any key, except the <ESC> key, until the program prompts with:

Do you want to add a NEW code? (Y/N)

4. Type 'Y' or 'y' to ADD a NEW code.

5. The program will prompt you for the new item and code for that item. An example screen for adding a new implement code follows.

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ADDING IMPLEMENT CODES

Enter NEW IMPLEMENT (<ESC> to abort) :

Enter NEW code number :

6. Press the <ESC> key to QUIT this operation. Otherwise, the program will accept your input item and code and search the code files to see if the new code item already exists.

7. If the code already EXISTS, an error message will be displayed and you will be prompted to enter a different item and its code.

8. If the code does NOT EXIST, then it will be added to the program code files and become a valid code.

PROCEDURES TO DELETE AN EXISTING CODE

This option may be used only to delete codes that were created by the user. It will NOT delete codes that are part of the system.

When you want to delete codes from an MDS form that allows user-entered codes, do the following.

1. Place the cursor within the code field where you want to delete a code.

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2. Press the <F1> key.

3. Press any key, except the <ESC> key until the program prompts with:

```
Do you want to add a NEW code? (Y/N)
```

4. Type 'N' or 'n' since you do NOT want to add a new code.

5. If there are any codes that may be deleted by a user, the program will prompt with:

```
Do you want to delete an existing code? (Y/N)
```

Otherwise, the program will return you to the input screen.

6. Type 'Y' or 'y' to DELETE an EXISTING code.

7. The program will prompt you for the existing code to be deleted. A sample screen for deleting an existing implement code follows.

DELETING EXISTING IMPLEMENT CODES **Version 2.1**

DELETING EXISTING IMPLEMENT CODES

NOTE: This option can be used only to remove codes that were added by the user. (<ESC> to abort)

Enter EXISTING code number to delete: **0**

8. Press the <ESC> key to QUIT this operation. Otherwise, when you ent a code number the program will search the code files to see if the code exists.

9. If the code does NOT EXIST, an error message will be displayed and yo will be prompted to enter another code.

10. If the code does EXIST, the program will display the code, the description associated with that particular code, and prompt you for confirmatio that the code should be deleted.

Pressing a 'Y' or 'y' will delete that code from the experiment code files.

Pressing a 'N' or 'n' will NOT delete the entered code and the program wi repeat its prompt for a code.

CHAPTER 9
PROBLEMS & SOLUTIONS

ERROR MESSAGES

This chapter lists screen error messages that may be encountered while running the Experiment Data Entry program, and corrective actions that may be taken.

EXPERIMENT DATA ENTRY PROGRAMS ERROR MESSAGES

Screen Message	Descriptions	Action
Invalid Institute ID		Refer to IBSNAT TR1, 3rd ed., Appendix, for assigned INSTI TUTE ID codes or write (telex) to IBSNAT or press the <F1> key when in Form A.
Invalid Crop Code		Refer to IBSNAT TR1, 3rd ed., Form A, or press the <F1> key when in Form A.
Invalid IMPLEMENT CODE		Refer to IBSNAT TR1, 3rd ed., Form K, or press the <F1> key when in Form K.
Invalid MATERIAL CODE		Refer to IBSNAT TR1, 3rd ed., Form N, or press the <F1> key when in Form N.
Invalid PLACEMENT CODE		Refer to IBSNAT TR1, 3rd ed., Form N, or press the <F1> key when in Form N.
Invalid METHOD CODE		Refer to IBSNAT TR1, 3rd ed., Form N, or press the <F1> key when in Form N.
Invalid PRODUCT CODE		Refer to IBSNAT TR1, 3rd ed., Form O, or press the <F1> key when in Form O.

Screen Message	Description	Action
Invalid GROWTH STAGE		Refer to IBSNAT TR1, 3rd ed., Forms R-1 and R-2, or press the <F1> key when in Form R-1 or R-2.
Invalid COMPONENT CODE		Refer to IBSNAT TR1, 3rd ed., Form Q or press the <F1> key when in form Q.
Invalid HARVEST CODE		Refer to IBSNAT TR1, 3rd ed., Forms R-1 and R-2, or press the <F1> key when in Form R-1 or R-2.
DUPLICATE found	Tried to add duplicate code to code data files.	Refer to IBSNAT TR1, 3rd ed., K, N, O, Q, R-1 or R-2.
Record not found	No data for the identification key code exists in the current database.	Enter some data associated for that form.
Record already exists	Data for a form associated with the identification key code already exists in the current database.	Delete or edit old data.

Table of Contents
WEATHER DATA ENTRY

CHAPTER 1
INTRODUCTION

PROGRAM DESCRIPTION

The Weather Data Entry program allows users to enter into DSSAT the weather data that was recorded in Form C of the Minimum Data Set (MDS). With this program, you can enter, edit, and print the information contained in Forms C-1 and C-2 of the MDS (see IBSNAT TR1, 3rd ed.).

The Weather Data Entry program allows you to do the following.

- Enter new weather data into weather data base.
- Edit, delete, and print weather data that are stored in the weather data base.
- Upgrade weather data to version 2.1 format.
- Re-index damaged index files for a Weather data set.
- Convert the units used to record data in a Weather data set.
- Append data stored in another Weather data set to the currently selected Weather Data files.

PREPARE WEATHER DATA STORAGE LOCATION

A weather data set stored in DSSAT is a collection of data base files. These files can be stored either in a subdirectory in your hard disk or on a floppy disk. For a hard-disk system, no special preparation is required. The Weather Data Entry program will create the necessary subdirectory for the weather data set.

To store the files on a floppy disk, prepare a WEATHER DATA disk using the following procedures.

1. Format a blank disk. Refer to the FORMAT command in your IBM DOS manual.

2. Label the disk WEATHER DATA (version 2.1) and include the Institute ID, Weather Station ID (see Chapter 3 for descriptions of the Institute and Weather Station IDs). For example,

WEATHER DATA (Version 2.1)
IB
WA

PROCEDURES FOR SENDING WEATHER DATA TO IBSNAT

IBSNAT requests that collaborators send weather data to IBSNAT headquarters in both disk- and hard-copy form. The procedures for sending the data are as follows.

1. Make a copy of the Weather Data disk and a copy of the completed Forms C-1 and C-2 found in IBSNAT TR1, 3rd ed. Keep the originals for your own records.

2. Label the copy disk with the Institute ID and Weather Station ID (see Chapter 3 for descriptions of Institute and Weather Station IDs).

3. Mail the copies of Forms C-1 and C-2 and the WEATHER DATA disk to:

IBSNAT Project
University of Hawaii
2500 Dole Street, Krauss Hall 18
Honolulu, HI 96822,
USA

Disks should be packed in a rigid, sturdy envelope or box for mailing.

Chapter 2
START WEATHER DATA ENTRY PROGRAM

EXECUTE WEATHER DATA ENTRY PROGRAM

Hard-disk Users

To access the Weather Data Entry program from the DSSAT shell, select "E Data Entry" from the DBMS main menu and open the Data Entry menu. Then select "W Weather Form C" to execute the Weather Data Entry program.

Floppy-disk Users

To access the Weather Data Entry program, insert the "Weather Data Entry Form C" disk in drive A. At the DOS prompt A>, type WEATHER and then press the <ENTER> key.

While the program is processing, DO NOT remove the program disk from the drive, unless instructed.

NOTE: All areas where users must enter a response are highlighted on the screen. Press the <ENTER> key to complete an entry.

WEATHER DATA ENTRY **Version 2.1**

Wea Master List	
IB	WA
CH	TD
DN	CR
FN	ET

PgUp/PgDn-Scrolls Window

Current Selected Weather Data Set

Drv & Path ....> C:\WEATHER\IBWA

Weather ID ...> IB WA Period.>04/03/87 to 09/10/87
Institute ....> International Benchmark Sites
.......................> Network for Agrotechnology Transfer

Country ....> U.S.A

Station name.> Waipio Weather Station

Messages

<ENTER>	=	Continue with above weather data.
<F1>	=	Help.
<F2>	=	Select Weather Data by entering the drive, path, and ID codes.
<F3>	=	Create new weather data files.
<ESC>	=	Return to previous menu.

This screen has three main windows. In the left window, "Wea Master List" shows all the weather data sets available in DSSAT. The top right window displays information on a Weather data set highlighted in the "Wea Master List." The bottom right window shows the key options available while in this screen.

WEATHER DATA SELECTION

Select a data set from the "Wea Master List," or create a new data set, or enter the drive and path where the existing data set is located.

Hard-disk Users

To create a new weather data set, do the following.

1. Press the <F3> key. Enter the drive and pathname where you want the weather data set stored (see 'Drive' and 'Pathname' above). The program will create a weather data set directory and

ID file; the message "Creating new data set..." will appear on the screen.

2. Enter the two identification key codes (see section below entitled "Identification Key Codes") when prompted.

To select a data set from the "Wea Master List," do the following.

Highlight the desired data set by using the cursor movement keys and press the <ENTER> key. If no weather data set filenames are in the DSSAT master list, the message [NO ITEMS IN LIST] will be displayed.

To select a data set by entering the drive and path, do the following.

Press the <F2> key. Enter the drive and pathname where an existing data set resides.

DRIVE: Enter the letter representing the drive where the weather data are located (e.g., 'A').

PATHNAME: Enter the pathname of the subdirectory where the weather data are located. If you are not using subdirectories, then enter '\' for the root directory (e.g., '\' refers to the root directory; '\DATA' refers to the subdirectory DATA). If you are not sure what a pathname is, refer to your DOS manual.

Floppy-disk Users

To create a new experiment, do the following.

1. Insert the WEATHER DATA disk into an available drive. Press the <F3> key.

2. Enter the drive and pathname where you want the weather data set stored (see 'Drive' and 'Pathname' in the "Hard-disk Users" section above). The program will create a weather data set directory and an ID file; the message "Creating new data set....." will appear on the screen.

3. Enter the two identification key codes (see following section, "Identification Key Codes") when prompted.

To select a data set, do the following.

1. Insert the WEATHER DATA disk into an available drive. Press the <F2> key.

2. Enter the drive and pathname where the data set is located (see 'Drive' and 'Pathname' in the "Hard-disk Users" section above).

NOTE: The "Wea Master List" shown in the left window of the example screen will display the message [NO ITEMS IN LIST].

IDENTIFICATION KEY CODES

In the DSSAT DBMS, the Minimum Data Set (MDS) for each weather data set is stored and retrieved by a sequence of the following two identifications. Enter these ID codes when prompted.

INSTITUTE ID. A unique two-character ID code assigned by IBSNAT to identify collaborators' institutes. A listing of these codes is given in the the *DSSAT User's Guide-Introduction.* If your institute is not listed there, use code '99'. IBSNAT will assign and send you an ID code at a later date.

WEATHER STATION ID. This is selected by the collaborator. A simple method to identify the station is to use the first two characters of the station name. When there is only one weather station at an experiment site, the ID used as the Site ID (see Chapter 2 of the *DSSAT User's Guide–Experiment Data Entry*) can be selected for the Weather Station ID. For a site with more than one weather station, choose a two-character ID code for each weather station.

UPGRADE A FILE TO VERSION 2.1

If the weather data set you selected was created with version 1.1 of the Weather Data Entry program, this dialog box will appear:

```
Invalid data base version. You may be using a weather data base
created with an earlier version of the weather program.
You may upgrade your data base to version 2.1.

Do you wish to upgrade your weather data? (Y/N)   Y
```

Answer 'Y' to convert your weather file to the new format. Before the conversion starts, the program will prompt you for the measurement units used in the weather files. It is very important to specify the units correctly. After you have confirmed that the units are correct, the program will convert your weather files to version 2.1. DO NOT USE THE OLD VERSION OF THE WEATHER PROGRAM AFTER YOU HAVE CONVERTED TO VERSION 2.1.

CREATE A WEATHER DATA FILE

To create a new weather data file, press the <F3> key. You will be prompted for the drive, path, Institute ID, and Station ID of the new data set. The new weather file will be created on the drive and subdirectory specified. When you are entering information for the first time and select the <F3> key to create a new weather data file, the following screen will appear.

```
WEATHER DATA ENTRY                                          Version 2.1
------------------------------------------------------------------------

   Enter information concerning weather data IB WA:

   Station Name:  IBSNAT's Waipio Weather Station

   Latitude   (deg., min.):   21     Min.:  25    Direction  (N, S):  N
   Longitude  (deg., min.):  158     Min.:   0    Direction  (E, W):  W

   Specify the units of the weather data (1 or 2):  1

        1) Metric System
        2) English System

   Specify the unit of measure used for Solar Radiation (1 or 2):  1

        1) MJ/m2
        2) cal/cm2

------------------------------------------------------------------------
 <ESC> to quit
```

Specify the weather station's name, location, and the units you wish to use while entering the data. After the program has created the weather file, a window will appear giving you an option to add the data set to the weather master list. If you add the data set to the list, it will appear as a menu selection on the first screen.

Once the program has located or created the weather files, the Weather Data Entry main menu will appear.

WEATHER DATA ENTRY **Version 2.1**

FORM C - MAIN MENU

1) Enter/Edit Observation Time
2) Enter/Edit/Print Required Data
3) Enter/Edit/Print Additional Data
4) Edit Weather Station Name and Location
5) Run Utilities

Select a menu item by number:

<ESC> to quit

MAIN MENU FOR WEATHER DATA ENTRY

Options 1-5

Option 1 allows you to enter or edit observation time records for Forms C-1 and C-2. Go to Chapter 3 in this User's Guide.

Option 2 allows you to enter, edit, or print required weather data (Form C-1). You can also enter, edit, or print comment records for the required data. Go to Chapter 4 in this User's Guide.

Option 3 allows you to enter, edit, or print additional weather data (Form C-2). You can also enter, edit, or print comment records for the additional data. Go to Chapter 4 in this User's Guide.

Option 4 allows you to change the station name and location that you assigned to the weather station for Forms C-1 and C-2 when the data files were created. Go to Chapter 5 in this User's Guide.

Option 5 allows you to access the utility functions of this program. These utilities allow you to:

1) convert the units of a weather file, and

2) re-index the weather file, and

3) append data from another weather data set. Go to Chapter 6 in this User's Guide.

CHAPTER 3
EDIT RECORDS

When you select Option 1, "Enter/Edit Observation Time," from the Weather Data Entry main menu, this screen will be presented.

WEATHER DATA ENTRY–FORM C - OBSERVATION TIME **Version 2.1**

OBSERVATION TIME - MENU

1) Add records
2) Change records
3) Delete records

Select a menu item by number:

<ESC> to quit

Observation time is the time of day when weather data were recorded at a site. In DSSAT, an "observation time record" contains both the observation time and the date, called the 'starting date', when data observations commenced. One weather site may have one or more of these records.

ADD RECORDS

Select Option 1 from the Observation menu (previous page) to add a record to the data base. The following is a sample add screen.

WEATHER DATA ENTRY–FORM C - OBSERVATION TIME (ADD) Version 2.1

INSTITUTE ID: IB WEATHER STATION ID: WA

STARTING DATE (dd/mm/yy)	OBSERVATION TIME (free format)
01/01/77	0600 AM
06/05/81	Micrologger

<F1> for help Add record 3

You will be prompted for information for the new record. Note that the cursor is displayed after the last record, if any, in the file. The weather program will not add a record until the starting date is entered as dd/mm/yy and the observation time is input.

You may also edit any existing records in this file, by moving the cursor to a record listed on the screen. If you try to move beyond the last record you will be prompted for information for a new record.

Press the <F1> key while in this screen for a help screen listing the following key strokes which you can use to move through the file.

<PgUp> - Move to PREVIOUS PAGE.
<CTRL><PgUp> - Move to PREVIOUS RECORD.

<CTRL><PgDn> - Move to NEXT RECORD.
<PgDn> - Move to NEXT PAGE.
<ESC> - EXIT the change screen.

CHANGE RECORDS

Select Option 2 from the Observation menu to change the content of any observation records currently in the file. When the change screen is presented, the first record will be highlighted. You may change the highlighted data, but THIS PROGRAM WILL NOT LET YOU CHANGE THE DATA TO BLANK FIELDS. Use the same key strokes as the add procedure to move from record to record.

DELETE RECORDS

Select Option 3 from the Observation menu to delete any record currently in the file. Upon entering the screen the first record will be highlighted. Move through the file using the key strokes described in the add procedure. To delete the highlighted record, press the <ENTER> key. The confirmation message,

Delete this one? (Y/N)

will be displayed at the bottom of the screen. Enter 'Y' to delete or 'N' to abort.

Chapter 4
ENTER/EDIT/PRINT REQUIRED & ADDITIONAL WEATHER DATA

When you select Option 2, "Enter/Edit/Print Required Data," or Option 3, "Enter/Edit/Print Additional Data," from the Weather Data Entry main menu, the following screens will be presented.

Procedures for entering, editing, or printing data in Form C-1 (required data) and in Form C-2 (additional data) are described in this chapter. The procedures for both forms are exactly the same, but the screens differ because the weather data in the forms are different. In the screens for Form C-1, the data are maximum and minimum temperatures, precipitation, and solar radiation; for Form C-2, the data are drybulb and wetbulb temperatures and windrun.

WEATHER DATA ENTRY–FORM C-1 **Version 2.1**

FORM C-1 –REQUIRED WEATHER DATA– MENU

1) Add Required Data
2) Change Required Data
3) Delete Required Data
4) Print Required Data
5) Edit Comments

Select a menu item by number:

<ESC> to quit

The menu presented here (see previous page) is the menu for the Required Weather Data (Form C-1). The Additional Weather Data (Form C-2) menu has identical selections.

ADD WEATHER DATA

Select Option 1 from the Required or Additional Weather Data menu to add records into the data base. The following dialog box will appear.

Enter a valid year (from 1900 to 2000) or <ESC> to abort.

Enter the year to which you wish to add data. <ESC> to abort.
Year: 1987

After inputting the year, the following dialog box will appear.

Enter the month to which you wish to add data. <ESC> to abort.
Year: 1987 Month:

January	February	March	April	**May**	June
July	August	September	October	November	December

Use the ↑ and ↓ arrow keys to highlight the month you want. Press the <ENTER> key to select the month or the <ESC> key to abort.

After selecting the month, the add screen, similar to the following sample screen, will appear.

WEATHER DATA ENTRY–FORM C-1 (ADD) **Version 2.1**

INSTITUTE ID: IB WEATHER STATION ID: WA OBSERVATION TIME: 0900 AM

DATE	TMIN	TMAX	PRECIP	SOLRAD	DATE	TMIN	TMAX	PRECIP	SOLRAD
dd/mm/yy	(C)	(C)	(mm)	(MJ/m^2)	dd/mm/yy	(C)	(C)	(mm)	(MJ/m^2)
01/05/87	31.5	17.5	0.0	13.60	16/05/87				
02/05/87	30.0	20.0	0.0	15.82	17/05/87				
03/05/87	24.5	18.5	0.0	10.59	18/05/87				
04/05/87	**-99.0**	**-99.0**	**-99.0**	**-99.00**	19/05/87				
05/05/87					20/05/87				
06/05/87					21/05/87				
07/05/87					22/05/87				
08/05/87					23/05/87				
09/05/87					24/05/87				
10/05/87					25/05/87				
11/05/87					26/05/87				
12/05/87					27/05/87				
13/05/87					28/05/87				
14/05/87					29/05/87				
15/05/87					30/05/87				
					31/05/87				

<F1> for help

Displayed are the dates for the selected month and year and any records currently in the data base. Blank areas after certain dates indicate that no data base record exists for that day.

The record to be added in this sample screen is highlighted. The number '-99' is inserted by the program when no data are available for that date. Fill in the weather data information for that date to create a new record, or press the <ENTER> key if you do not wish to create a record.

You may edit a previously entered record by moving the cursor to the date to be edited.

Press the <F1> key while in this screen for a help screen describing the following key strokes which you can use to move through the file.

<PgUp> - Move to the PREVIOUS MONTH
<CTRL><PgUp> - Move to PREVIOUS RECORD
<CTRL><PgDn> - Move to NEXT RECORD

<PgDn> - Move to NEXT MONTH
<ESC> - EXIT the add screen

CHANGE WEATHER DATA

Select Option 2 from the Required or Additional Weather Data menu to change records already entered in the data base. The following dialog box will appear at the bottom of the screen.

```
Use the cursor keys to select the year. <ESC> to abort.
Year:

1985    1986    1987
```

Displayed are the years for which data exist in the current weather file. Use the arrow keys to highlight the year to which you wish to change data. Press the <ENTER> key to select the year or the <ESC> key to abort change.

After selecting the year, the following dialog box will appear.

```
Use the cursor keys to select the month. <ESC> to abort.
Year: 1987   Month:

January    March    April    May
```

Displayed are the months for which data exist for the selected year. Use the ↑ and ↓ arrow keys to highlight the month to which you wish to change data. Press the <ENTER> key to select the month or the <ESC> key to abort the change screen.

After selecting the month, the change screen, similar to the following sample screen, will appear.

WEATHER DATA ENTRY–FORM C-2 (CHANGE) **Version 2.1**

INSTITUTE ID: IB WEATHER STATION ID: WA OBSERVATION TIME: 0900 AM

DATE dd/mm/yy	WETBULB (C)	DRYBULB (C)	WINDRUN (km)	DATE dd/mm/yy	DRYBULB (C)	WETBULB (C)	WINDRUN (km)
01/05/87	**21.0**	**26.0**	**4.84**	16/05/87			
02/05/87	19.5	21.0	4.48	17/05/87			
03/05/87	20.1	24.0	5.91	18/05/87			
04/05/87	19.0	21.0	5.31	19/05/87			
05/05/87	19.0	22.0	4.23	20/05/87			
06/05/87	19.0	20.0	5.49	21/05/87			
07/05/87	20.5	23.0	3.30	22/05/87			
08/05/87	-99.0	-99.0	-99.0	23/05/87			
09/05/87	20.0	22.0	4.30	24/05/87			
10/05/87	20.0	22.0	5.09	25/05/87			
11/05/87	21.0	24.0	4.62	26/05/87			
12/05/87				27/05/87			
13/05/87				28/05/87			
14/05/87				29/05/87			
15/05/87				30/05/87			
				31/05/87			

<F1> for help

Displayed are dates for the selected month and year and any records currently in the data base. Blank areas after certain dates indicate that no data base record exists for that day.

The highlighted area in the screen indicates where the cursor is currently positioned. You may enter new values to replace those shown.

Press the <F1> key while in this screen for a help screen describing the following key strokes which you can use to move from record to record, or to another month.

<PgUp>	-	Select a NEW MONTH
<CTRL><PgUp>	-	Move to PREVIOUS RECORD
<CTRL><PgDn>	-	Move to NEXT RECORD
<PgDn>	-	Select a NEW MONTH
<ESC>	-	EXIT the change screen

If you press <PgUp> and <PgDn> keys to select a new month, the system will again prompt you to select a year and a month.

DELETE WEATHER DATA

Select Option 3 from the Required or Additional Weather Data menu to delete records from the data base. The Delete menu displayed below will appear. Select a menu item by number or the <ESC> key to return to the previous menu.

```
WEATHER DATA ENTRY–FORM C-1 (DELETE)                Version 2.1
================================================================

                DELETE REQUIRED DATA - MENU
================================================================

                1) Delete a range of data
                2) Delete individual records

================================================================

                Select a menu item by number:


----------------------------------------------------------------
<ESC> to quit
```

Option 1

To delete a record between a specific range of dates, select Option 1 from the Delete menu. You will then be asked to enter a range of data (beginning and ending dates). Following is a sample screen.

WEATHER DATA ENTRY–FORM C-1 (DELETE) **Version 2.1**

Currently the database dates range from 01/06/85 to 12/05/87

Enter the range of dates to delete.

Beginning Date (dd/mm/yy) / /

Ending Date (dd/mm/yy) / /

<ESC> to quit

After entering the dates and confirming that they are correct, you will be asked if you wish to review the data before deleting. If you answer 'N', the system will then delete the records within the range specified.

If you answer 'Y', the data within the range specified for deletion will be displayed. You will then be asked if you wish to delete the data. If you answer 'Y' the data will then be deleted.

Option 2

To delete individual records, select Option 2 from the Delete menu. You will be asked to select the year and month of the data to be deleted. The procedure for selecting the month and year is similar to the procedure in the section "Change Weather Data."

To delete a highlighted record, press the <ENTER> key. A dialog box will appear. Enter 'Y' to delete or 'N' to abort deleting.

Press the <F1> key while in this screen for a help screen describing the following key strokes which you use to move through the file.

<PgUp> - Select a NEW MONTH
<CTRL><PgUp> - Move to PREVIOUS RECORD
<CTRL><PgDn> - Move to NEXT RECORD
<PgDn> - Select a NEW MONTH
<ESC> - EXIT the screen

PRINT WEATHER DATA

Select Option 4 from the Required or Additional Weather Data menu to produce a printed copy of the data stored in the weather files. The Print menu shown below, will be displayed. Select a menu item by number. Use the <ESC> key to abort or the <ENTER> key to return to the previous menu.

WEATHER DATA ENTRY–FORM C-1 (PRINT) **Version 2.1**

REQUIRED DATA PRINT MENU

1) Print All Data
2) Print a Range of Data

Select a menu item by number:

<ESC> to quit

Option 1

If you select Option 1 from the Print menu, be sure your printer is ready before printing.

WEATHER DATA ENTRY–FORM C-1 (PRINT) **Version 2.1**

Currently the database dates range from 01/06/85 to 12/05/87

Enter the range of dates to print.

Beginning Date (dd/mm/yy) / /

Ending Date (dd/mm/yy) / /

<ESC> to quit

Option 2

If you select Option 2, the system will display the above screen.

Enter the beginning and ending dates of the data you wish to print.

COMMENT WEATHER DATA

Select Option 5 from the Required or Additional Weather Data menu to ad comments to the weather data. The comments are identified by the month and year of the data to which they pertain. The Comments menu shown below, will be displayed. Select a menu item by number. Use the <ESC> key to quit.

WEATHER DATA ENTRY–FORM C-2 **Version 2.1**

WEATHER DATA COMMENTS (Additional Data)

1) Add Comments
2) Change Comments
3) Delete Comments

Select a menu item by number:

<ESC> to quit

Option 1

Select Option 1 from the Comments menu to add a comment. Two dialog boxes will prompt you for the year and month of the comment. Once you have identified the month, the following screen will appear.

WEATHER DATA ENTRY–FORM C-2 **Version 2.1**

WEATHER DATA COMMENTS (Additional Data)

Add comments for January '87 (Additional Data)

Weather Station malfunction - Rainfall missing for 16 thru 19 due to faulty sensor.

<F1> for help Add record 1

Add comments in the highlighted areas. Note that the cursor is positioned after the last comment line in the file. You may edit existing comments in this file by moving the cursor to the comment you wish to edit. If you try to move beyond the last record you will be prompted for information about a new record.

Press the <F1> key while in this screen for a help screen describing the following key strokes which you use to move through the file.

<PgUp> - Move to PREVIOUS PAGE
<CTRL><PgUp> - Move to PREVIOUS COMMENT line
<CTRL><PgDn> - Move to NEXT COMMENT line
<PgDn> - Move to NEXT PAGE
<ESC> - EXIT the add screen

Option 2

Select Option 2 from the Comments menu to change the content of any comment records currently in the file. After identifying the month and year

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of the comments, a screen to allow editing of comments will be presented with the first record highlighted. Change the highlighted data and/or mov to the next record by using the key strokes previously listed to move through the file.

Option 3

Select Option 3 from the Comments menu to delete any comments currently in the file. After identifying the month and year of the comments, the delete screen will be displayed with the first comment highlighted. Pressing the <ENTER> key will delete a highlighted record. Confirm deletion by entering 'Y' to delete or 'N' to abort when prompted.

Chapter 5
EDIT WEATHER STATION NAME AND LOCATION

When you select Option 4, "Edit Weather Station Name and Location," from the Weather Data Entry main menu, the following screen will be presented.

Edit name and location of weather station:							
Station Name:	**IBSNAT's Waipio Weather Station**						
Latitude	Deg:	**21**	Min:	**25**	Direction (N, S):	**N**	
Longitude	Deg:	**158**	Min:	**0**	Direction (E, W):	**W**	

When a weather file is created, the name of the weather station and the geographical location entered by the user will be placed in a record. All these items can be edited. They are highlighted in the above dialog box. Use the ↑ and ↓ keys or press the <ENTER> key to move from one item to another.

Enter the new information. Press the <ENTER> key after the last item ("Direction (E,W):") to return to the Weather Data Entry main menu.

CHAPTER 6
RUN UTILITIES

When you select Option 5, "Run Utilities," from the Weather Data Entry main menu, the following screens will be presented. The utility function allows you to convert the units of a data base file, to re-index the data base file, and to append data from another weather data set. Select the menu item by number from the Utility menu shown below or press the <ESC> key to quit this screen and return to the Weather Data Entry main menu.

WEATHER DATA ENTRY–UTILITIES **Version 2.1**

WEATHER UTILITIES MENU

1) Convert Database Units
2) Reindex Database Files
3) Append Data from Another Weather Data Set (Form C)

Select a menu item by number:

<ESC> to quit

CONVERT UNITS

Select Option 1 from the Utilities menu (above) to convert the units used to record the data in the weather file. The units for minimum and maximum temperatures, precipitation, drybulb and wetbulb temperatures can be entered as English units or metric units. For temperature, the metric units are degrees Celsius and the English units are degrees Fahrenheit. For precipitation, the metric units are millimeters and the English units are inches. The unit for solar radiation can be entered in either MJ/m^2 or cal/cm^2.

Enter your choices for the units or press the <ESC> key to quit. Below is a sample screen.

WEATHER DATA ENTRY–UTILITIES (CONVERT) **Version 2.1**

The data base is currently using the Metric system for temperature and rainfall.

Enter new unit system for reporting temperature and rainfall:

1. Metric
2. English

The data base is currently using MJ/m^2 for reporting solar radiation.

Enter the new units for reporting solar radiation:

1. MJ/m^2
2. Cal/cm^2

<ESC> to quit

After confirming your choices, the system will perform the necessary conversion. You will be returned to the Utilities menu after the conversion is finished.

Select Option 2 from the Utilities menu to rebuild the data-base index files.

RE-INDEX DATA BASE FILES

Upon selection of Option 2, the Utility program will rebuild the files and then return you to the Utilities menu. Index files are used by the Weather Data Entry program to access the weather data in chronological order, even if the data have not been entered chronologically. The data-base system automatically updates the index files whenever any changes are made to the data. Re-indexing the file is needed only if the index file is damaged.

A damaged index file results if unusual events occur while using the Weather Data Entry program. These events can range from a power failure while using the program to someone removing the data disk before the program has ended.

APPEND DATA FROM ANOTHER WEATHER DATA SET

Select Option 3 from the Utilities menu to append the data stored in another weather data set to your currently-selected weather data file. If the Institute ID or Station ID of the two data sets are not the same, the IDs of the appended data will be converted to the currently-opened data set. If you are appending data for dates that already exist in your current file, the newly-imported data will replace the data in the current weather data files.

Enter the drive and path, and Institute and Station IDs. After the program has located the data set, it will prompt you for the range of dates to be appended. Once the dates have been entered correctly, the program will read and append the imported data. The Utilities menu will then be presented.

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MDS RETRIEVAL for CROP MODELS

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Chapter 1
INTRODUCTION

PROGRAM DESCRIPTION

The MDS Retrieval for Crop Models program (or MDS Retrieval program), retrieves experiment and weather data entered into the DSSAT MDS Forms A-S and creates output files needed to run the crop models. These files (listed and briefly described below) are outputted in the file structure formats described in IBSNAT TR5.

FILE1 - Daily Weather Data
FILE2 - Soil Profile Properties
FILE4 - Soil Nitrogen Balance Parameters
FILE5 - Soil Profile Initial Conditions
FILE6 - Irrigation Management Data
FILE7 - Fertilizer Management Data
FILE8 - Treatment Management Data
FILE9 - Genetic Coefficient Data
FILEA - Measured Crop Summary Data
FILEB - Observed Data for Graphics
Directory files - for experimental and weather files

FILES CREATED BY MDS RETRIEVAL PROGRAM

The MDS Retrieval program creates FILEs 1, 4, 5, 6, 7, 8 for all IBSNAT crop models. FILEs A and B, whose formats are crop specific, are created only for crop models now linked with DSSAT. All created files are named by the program using the file-naming convention described in TR5, and the names are added to the specific crop model's directory files (WTH.DIR and EXP.DIR). Crop Model directory files will be created by the program if they do not exist when the output files are created.

SOURCE DATA OF MDS RETRIEVAL PROGRAM

The MDS Retrieval program retrieves data from the data sets that were inputted into DSSAT using the Experiment Data Entry and Weather Data Entry programs (see *DSSAT User's Guides–Experiment Data Entry and Weather Data Entry*). Table A lists the MDS forms for the source data used to create the crop model files.

FILE2 and FILE9 are NOT created by the MDS Retrieval program; instead, the program reads data required by the models from these files. FILE2 is either provided on the crop model's data directory (or disk) or is created by

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a user using the Soil Retrieval for Crop Models program (see *DSSAT User's Guide–Soil Data Retrieval for Crop Models*). FILE9 is provided on each crop model's data directory (or disk).

Although the MDS Retrieval program will continue if soil profile files are not in FILE2 and/or genetic coefficient data are not in FILE9, *please note* that the data from FILE2 and FILE9 are *required* to run the models.

Table A - Retrieval Program Data Source for Output Files

Data Source*	Output Files
Form C-1	FILE1
Form H	FILE4
Form I-1, J-1	FILE5
Form P	FILE6
Form N	FILE7
Form F-1, F-2, M, R-1; FILEs 2, 9	FILE8
Form R-1, R-2, S	FILEA
Form R-1, R-2, S	FILEB

*Although not shown, information from Forms F-3 and F-4 is used by the MDS Retrieval progam to calculate treatment average data for all output files storing data by treatment.

Chapter 2
START THE RETRIEVAL PROGRAM

EXECUTE MDS RETRIEVAL PROGRAM

Hard-disk Users
To access the MDS Retrieval program from the DSSAT Shell, select option "R Retrieval" from the DBMS main menu and open the Retrieval menu. Then select "E MDS Data" to execute the MDS Retrieval program.

Floppy-disk Users
To access the MDS Retrieval program, insert the "MDS Retrieval for Crop Models" disk in drive A. At the DOS prompt A>, type RETRIEVE and then press the <ENTER> key.

While the program is processing, DO NOT remove the program disk from the drive unless instructed.

NOTE: All areas where users must enter a response are highlighted on the screen. Press the <ENTER> key to complete an entry.

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MDS RETRIEVAL FOR CROP MODELS **Version 2.1**

Retrieval Main Menu

1) Experiment Data
2) Weather Data
3) Experiment and Weather Data

Highlight an option using the arrow keys.
Press <ENTER> to select an option.

<ESC> to quit, <F1> for help.

MAIN MENU FOR MDS RETRIEVAL

The MDS Retrieval main menu screen presents three options.

Option 1

Option 1 enables retrieval of experiment data from MDS Forms A–S, except Form C. From these data, the program creates IBSNAT-formatted crop model FILEs 4, 5, 6, 7, 8, A, B and updates the crop model experiment directory file (EXP.DIR). If you choose this option, follow the instructions in Chapter 3 of this User's Guide.

Option 2

Option 2 enables retrieval of weather data from Form C. From these data, the program creates IBSNAT-formatted crop model FILE1 and updates the crop model weather directory file (WTH.DIR). If you choose this option, follow the instructions in Chapter 4 of this User's Guide.

Option 3

Option 3 enables retrieval of both experiment and weather data from Forms A-S. From these data, the program creates IBSNAT-formatted crop model

FILEs 1, 4, 5, 6, 7, 8, A, B and updates the crop model directory files (EXP.DIR and WTH.DIR). If you choose this option, follow the instructions in Chapters 3 and 4 of this User's Guide.

Chapter 3
RETRIEVE AN EXPERIMENT DATA SET

When you select either Option 1, "Experiment Data," or Option 2, "Experiment and Weather Data," from the MDS Retrieval main menu, the following screens will be presented.

```
MDS RETRIEVAL FOR CROP MODELS-EXPERIMENT DATA                Version 2.1
------------------------------------------------------------------------
                       Select Experiment Data Set to Retrieve
== Exp Master List ==  ============ Currently Selected MDS ============
                       Drv & Path ....>  B:\MAIZE\IB\WA\83\01
MAIZE   IB WA 83 1
MAIZE   IB OL 85 1     Exp. ID..........>  IB WA 83 1

                       Institute .........>  International Benchmark Sites
                                         >  Network for Agrotechnology Transfer

                       Country .........>  U.S.A.

                       Experiment .. >  Maize cultivar by applied nitrogen
                       description ....>  fertility experiment Cultivars are
                                     >  Pioneer X304C and H610
                       ================= Messages =================
                         <ENTER>  =  Continue with currently selected MDS.
                            <F1>  =  Help.
                            <F2>  =  Select Experiment by entering the
                                     drive and path of the data.
PgUp/PgDn-Scrolls Window   <ESC>  =  Return to previous menu.
```

This screen has three main windows. In the left window, the "Exp Master List" shows all the experiment data sets available in DSSAT. The top right window displays information about an experiment data set highlighted in the "Exp Master List." The bottom right window shows the key options available while in this screen.

EXPERIMENT SELECTION

Select a data set from the "Exp Master List" or enter the drive and path where the existing data set is located.

Hard-disk Users

To select an experiment from the "Exp Master List," do the following.

> Highlight the desired experiment by using the cursor movement key and press the <ENTER> key. If no experiment filenames are in the DSSAT master list, the message [NO ITEMS IN LIST] will be displayed.

To select an experiment by entering the drive and path, press the <F2> key.

> Enter the drive and pathname where the existing experiment resides.
>
> DRIVE: The letter representing the drive where the experiment data are located (i.e., 'A').
>
> PATHNAME: The pathname of the subdirectory where the experiment data are located. If you are not using subdirectories, then enter '\' for the root directory (e.g., '\' refers to the root directory; '\DATA' refers to the subdirectory DATA). If you are not sure what a pathname is, refer to your DOS manual.

Floppy-disk Users

To select an experiment, do the following.

> 1. Insert EXPERIMENT DATA disk into an available drive. Press the <F2> key.
>
> 2. Enter the drive and pathname where the data set is located (see 'Drive' and 'Pathname' section above).

NOTE: The "Exp Master List" shown in the left window of the sample screen will display the message [NO ITEMS IN LIST].

MDS RETRIEVAL FOR CROP MODELS-EXPERIMENT DATA **Version 2.1**

This option can create the files listed below. To have a file created, enter 'Y' at the prompt. If you wish to skip a file, enter 'N'.

Create FILE	4	(IBWA8301.MZ4) . . .		
Create FILE	5	(IBWA8301.MZ5) . . .		
Create FILE	6	(IBWA8301.MZ6) . . .		
Create FILE	7	(IBWA8301.MZ7) . . .		
Create FILE	8	(IBWA8301.MZ8) . . .	Y	(Required)
Create FILE	A	(IBWA8301.MZA). . .		
Create FILE	B	(IBWA8301.MZB) . . .		

Would you like to compile messages on the retrieved values? (Y/N) **Y**

<ESC> to quit

SELECT FILE TO RETRIEVE You may elect to have all the files in the above screen created by pressing the <ENTER> key after each prompt. For any file which you do not want created, type 'N' at the prompt next to that file and press the <ENTER> key.

DATA REPORT If you select the option to have a report compiled which lists missing or default values found in the source data forms, the program will store this report in a file which you can review (on screen or printed) after retrieval is completed. Whether or not you choose to have a report compiled, it is recommended that after retrieval, you check the retrieved data file for any input errors.

NOTE: Message compilation requires a large amount of disk space. ***Do not use this option if you are running the Retrieval program from a 360K disk.***

MDS RETRIEVAL FOR CROP MODELS-EXPERIMENT DATA **Version 2.1**

To obtain the coefficient ID number, the retrieval program will search FILE9 (Genetic Coefficient Data) on the crop model data disk to match the cultivars used in the experiment MDS.

Input the location of FILE9; usually this file is located on the crop model data disk.

If necessary, replace your experiment data disk with the disk that contains the FILE9.

DRIVE & PATH B : \

FILE NAME GENETICS.MZ9

<ESC> to continue without searching FILE9.

CULTIVAR ID SELECTION

To obtain a listing of the crop model's current cultivar name and ID numbers, the MDS Retrieval program accesses FILE9 from the crop model data directory/disk. In the above screen, the program will present a default drive, path, and filename. Change these default values if necessary.

If FILE9 is not available for the crop model, press the <ESC> key to continue the retrieval process. In this case, the MDS Retrieval program will enter default values for the Genetic Coefficient data.

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CULTIVAR NAME	ID
A632 X VA261	28
A632 X W117	20
A654 X F2	8
B14 X C103	18
B14 X C131A	17
B14 X OH43	30
B56 X C131A	39
B59 X C103	15
B59 X OH43	12
B60 X R71	14
B73 X MO17	37
B8 X 153R	31
C281	24
CP170	2
DEKALB XL45	11

Cultivar(s) used in this experiment are listed below. Press the <ENTER> key to keep the same value, or enter the correct cultivar ID after reviewing the table on the left.

TRT	CULTIVAR NAME	CUL. ID
1	PIO X304C	63
2	PIO X304C	63
3	PIO X304C	63
4	H610(UH)	60
5	H610(UH)	60
6	H610(UH)	60

<PgUp> to previous list; <PgDn> to next list;
<F1> for help.

The left-hand window of this screen lists the cultivar names and ID numbers found in FILE9. Listed on the right-hand side of the screen are the cultivars extracted from the experiment data file that was selected.

The MDS Retrieval program will match the cultivar name(s) in the experiment data file with those found in FILE9 and will enter, under "CUL.ID," the corresponding ID number(s). Sometimes names used in the MDS do not match, letter for letter, with those in FILE9 and the program will enter a '-9' under "CUL.ID," indicating no match. If this is the case, review the list on the left, match the cultivar names listed on the right with one in the left-hand window list, and input the correct cultivar ID number at the prompt. Use the <PgUp> and<PgDn> keys to scroll through the left-hand listing.

If there is no match, the program will record the default '-9' value in the output file.

The Minimum Data Set identifies the soil pedon number as "Waipio." To obtain the soil sequence number which identifies the soil profile definition to be used in the model, the Retrieval program will need to read FILE2 (Soil Profile Properties) from the crop model data directory.

Please specify the location of this file.

If necessary, replace your experiment data disk with the disk that contains the FILE2.

DRIVE & PATH B : \

FILE NAME **SPROFILE.MZ2**

<ESC> to continue without searching FILE2.

SOIL PROFILE SELECTION

Soil property descriptions found in a soil profile are needed to run the crop models. Profiles available to the models are stored in FILE2 by pedon number and/or location and a corresponding sequence number. It is this sequence number which must be retrieved for the crop models. The MDS Retrieval program locates and retrieves the sequence number in FILE2 by matching the pedon number given in Form D of the MDS to one in FILE2.

The MDS Retrieval program presents the default drive, path, and filename for FILE2. Change these default values if necessary.

NOTE: If FILE2 is on a floppy disk, replace the EXPERIMENT DATA disk with the crop model DATA DISK before pressing the enter key.

MDS RETRIEVAL FOR CROP MODELS – EXPERIMENT DATA Version 2.1

Seq.	Pedon No.	Soil Classification
05		MEDIUM SILT LOAM
06		SHALLOW SILT LOAM
07		DEEP SANDY LOAM
08		MEDIUM SANDY LOAM
09		SHALLOW SANDY LOAM
10		DEEP SAND
11		MEDIUM SAND
12		SHALLOW SAND
13	Waipio	Waipio (Clayey, kaolinitic, isohyperth, Tropeptic Eutrust)
14	Gainesville	Gainesville Millhopper fine sand (Loamy, silic, hyperth Arenic Paleudul)

<PgUp> to previous list; <PgDn> to next list.

The Minimum Data Set identifies the pedon number as "Waipio".
Please review the above list and enter the soil sequence number to be used in the crop models.

Sequence No. 13

The upper half of the above screen displays the sequence number, pedon, and soil classification of the soils defined in FILE2. The bottom half of the screen displays the pedon number from the experiment data file and the sequence number ("Sequence No.") found in FILE2 which matches the pedon number. You may change the sequence number to one of those listed in the top window.

If the program is unable to find a match, then it will enter a '-9' for the sequence number. Since the MDS Retrieval program will not accept a '-9' value for the crop model output files, you will need to choose one of the soils listed in the top window which most closely describes the soil used in the selected experiment and enter this sequence number at the prompt.

After a soil sequence number is selected (either by you or by the program) and the <ENTER> key is pressed, the profile description of this soil will be displayed inside the bottom window, and the following message will appear.

```
Is the above soil classification the one you want to use?    (Y/N)    Y
```

Type 'Y' if you wish to use the displayed soil classification. Type 'N' if you wish to select a different soil sequence number and soil classification.

SOIL INDEX VALUE

After you have selected a soil profile, you will be prompted for a soil index value. This value represents how much water is in the soil and allows the MDS Retrieval program to determine the soil water content for any soil layers not defined in FILE5.

At the prompt, enter a soil index value (0 to 1). A zero (0) value indicates the index is equal to the soil water lower limit, a value of 0.5 indicates the index is mid-way between the soil water upper and lower limit, and a value of one (1.0) indicates the index equal to the upper limit.

NOTE FOR FLOPPY-DISK USERS; If you have removed the EXPERIMENT DATA disk, reinsert it when prompted.

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MDS RETRIEVAL FOR CROP MODELS-EXPERIMENT DATA **Version 2.1**

FILE	NAME	STATUS
4	IBWA8301.MZ4	Done.
5	IBWA8301.MZ5	Done.
6	IBWA8301.MZ6	Done.
7	IBWA8301.MZ7	Done.
8	IBWA8301.MZ8	Done.
A	IBWA8301.MZA	Retrieving
B	IBWA8301.MZB	

FILE:	FILEA
NAME:	IBWA8301.MZA
SEARCHING:	FORM R-2
TREATMENT:	01 of 06
RETRIEVAL ERRORS	00

DATA RETRIEVAL Source data retrieval time will vary depending on the amount of experiment data and the speed of your computer. You can monitor its progress by checking the above screen. "Retrieval Errors" indicates the number of missing or default values retrieved.

Output Experiment Data to Crop Model Data Disks:

If using a floppy disk, place the crop model DATA DISK in the proper drive.

Enter the drive and pathname for the output files.

DRIVE & PATH: **B : **

<F1> for help.

WRITE OUTPUT FILES TO CROP MODEL DATA DISK

Once the output files have been created, their filenames need to be written to the crop model data directory or disk. Input the drive and pathname of the directory used to store the retrieved files using the following procedures.

Floppy-disk Users

1. Remove the EXPERIMENT DATA disk from the disk drive and insert the crop model DATA DISK in the drive.

2. Enter the drive and pathname of the subdirectory of the data disk (e.g., "B:\").

NOTE: The disk for the crop model data files could become full if approximately 8 or more experiment data sets are added. In this case, you will need to make another copy of the original crop model DATA DISK and use it for additional experiments.

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Hard-disk Users

1. If you want to write the retrieved data to a disk,
   a. Insert the disk in the proper drive.
   b. Enter the drive and pathname of the subdirectory of the data disk (e.g., "B:\").

2. If you want to write the retrieved data to an subdirectory on your hard disk, enter the drive and pathname of the subdirectory.

NOTE: If you are using a disk for the crop model data files, it could become full if approximately 8 or more Experiment data sets are added. You will need to make another copy of the original crop model DATA DISK and use it for additional experiments.

ASSIGN A WEATHER FILE

If Option 1 (Experiment Data) was selected from the MDS Retrieval main menu, a weather data file is not assigned to the entry in the experiment directory for the retrieved experiment. Since this must be done, the MDS Retrieval program requires you to either enter the weather file name or assign a weather file name from the output directory. The output directory in this case is the name of the subdirectory you designated (see section above, "Write Output File to Crop Model Disk") for your crop model data disk or hard disk. The following screen will appear.

Since you are retrieving an Experiment data set only, a Weather Data file name is not automatically assigned to this experiment. This screen allows you to assign a Weather file name from the ones stored in your output directory or you may manually enter the file name.

IBWA8301 maize cultivar x applied n trial SPROFILE.MZ2
IBWA8301.MZ4 IBWA8301.MZ5IBWA8301.MZ6 IBWA8301.MZ7IBWA8301.MZGENETICS.MZ9
IBXA8301.MZA IBWA8301.MZB OUT1.MZ OUT3.MZ OUT4.MZ OUT5.MZ

Use the ↑ ↓ cursor keys to select a weather file name to be assigned to this experiment or select 'User Input' to enter the weather file name yourself.

APAN0801.W86
CHTD0901.W84
IBWA0515.W84
User Input

ASSIGN A WEATHER FILE NAME

Because Option 1 does not retrieve weather data, the weather data file, FILE1, is not created. The crop model, however, requires this file when running a simulation using the experiment output files created by the use of Option 1, and thus it is necessary for you to name a weather file to be used as FILE1.

Name the file by entering a weather file name or by choosing a weather file name from those in the output directory you designated in the section, "Write Output Files to Crop Model Data Disk." The file names found in this directory are listed on the following screen in the boxed window, and it is recommended that you choose one from this list. To select a listed file name, highlight one using the ↑ and ↓ keys and press the <ENTER> key.

If there are no weather files in your output directory, select "User Input" and enter a file name. If you choose this option, the file name you enter should conform with the IBSNAT file-naming convention (see IBSNAT TR5).

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ERROR MESSAGES

If you chose to have error messages compiled and errors were detected during data retrieval, a dialog box will appear on the screen giving you a choice of a hardcopy printout or a screen display. Make sure your printer is turned on if you select the former.

This completes the MDS Retrieval program for Option 1, "Experiment Data." If you selected Option 3 from the MDS Retrieval main menu, "Experiment and Weather Data, " the retrieval process for the weather data will begin. Go to Chapter 4 in this User's Guide.

Chapter 4
RETRIEVE A WEATHER DATA SET

When you select either Option 2, "Weather Data," or Option 3, "Experiment and Weather Data," from the MDS Retrieval main menu, the following screens will be presented.

MDS RETRIEVAL FOR CROP MODELS-WEATHER DATA **Version 2.1**

Wea Master List

CH	TD
DN	CR
FN	ET
IB	**WA**

Currently Selected Weather Data Set

Drv & Path ....> C:\WEATHER\IBWA

Weather ID. ..> IB WA Period.> 04/03/87 to 09/10/87

Institute ....> International Benchmark Sites
> Network for Agrotechnology Transfer

Country ....> U.S.A.

Station name.> Waipio Weather Station

Messages

<ENTER> = Continue with currently selected MDS.
<F1> = Help.
<F2> = Select Weather Data by entering the drive and path of the data.
<ESC> = Return to previous menu.

PgUp/PgDn-Scrolls Window

This screen has three main windows. In the left window, the "Wea Master List" shows all the weather data sets available in DSSAT. The top right window displays information about a weather data set highlighted in the "Wea Master List." The bottom right window shows the key options available while in this screen.

WEATHER DATA SELECTION

Select a data set from the "Wea Master List" or enter the drive and path where the existing data set is located.

Hard-disk Users

To select an experiment from the "Wea Master List," do the following.

> Highlight the desired experiment by using the cursor movement key and press the <ENTER> key. If no experiment filenames are in the DSSAT master list, the message [NO ITFMS IN LIST] will be displayed.

To select an experiment by entering the drive and path, do the following.

1. Press the <F2> key. Enter the drive and pathname where the existing experiment resides.

2. Enter the Institute and Weather station IDs.

DRIVE: The letter representing the drive where the experiment data are located (i.e., 'A').

PATHNAME: The pathname of the subdirectory where the experiment data are located. If you are not using subdirectories, then enter '\' for the root directory (e.g., '\' refers to the root directory; '\DATA' refers to the subdirectory DATA). If you are not sure what a pathname is, refer to your DOS manual.

Floppy-disk Users

To select an Weather data set do the following:

1. Insert the WEATHER DATA disk in an available drive. Press the <F2> key.

2. Enter the drive and pathname where the data set is located (see 'Drive' and 'Pathname' above).

3. Enter the Institute and Weather Station IDs.

NOTE: The "Wea Master List" shown on the left of the screen does not apply and the message [NO ITEMS IN LIST] will be displayed.

MDS RETRIEVAL FOR CROP MODELS - WEATHER DATA **Version 2.1**

Enter the beginning and ending dates of the data to be retrieved.
The Weather data set ranges from 03/09/84 to 02/01/87

BEGINNING DATE (dd/mm/yy) : **03/09/84**

ENDING DATE (dd/mm/yy) : **02/01/86**

Confirm the geographical location of the weather data:

LONGITUDE: Deg: **123** Min: **30**

LATITUDE: Deg: **180** Min: **55**
(For Latitude degrees enter negative for south, positive for north)

Would you like to compile messages on the retrieved values? (Y/N) **Y**

<ESC> to quit

ADDITIONAL INPUTS

Once the program has located the weather data file, the above screen is displayed.

Beginning and Ending Dates

1. To keep the default dates shown on the screen, which are those contained in Form C of the weather data set selected, press the <ENTER> key after each date.

2. If you wish to change these dates, use the ↑ and ↓ arrow keys to highlight the dates shown on the screen, enter the beginning and ending dates of the period to be retrieved, and press the <ENTER> key.

Longitude and Latitude

You may also edit the longitude and latitude values retrieved from Form C and shown on the screen.

DATA REPORT

If you select the option to have a report compiled which lists missing or default values found in the source data forms, the program will store this report in a file which you can review (on screen or printed) after retrieval is completed. Whether or not you choose to have a report compiled, it is recommended that after retrieval, you check the retrieved data file for any input errors.

NOTE: Message compilation requires a large amount of disk space. Do not use this option if you are running the Retrieval program from a 360K disk.

MDS RETRIEVAL FOR CROP MODELS-WEATHER DATA **Version 2.1**

Output Weather Data to Crop Model Data Disk:

If using a floppy disk, place the crop model DATA DISK in the proper drive.

Enter the drive and pathnames for the output files.

DRIVE & PATH: **B : **

<F1> for help.

WRITE RETRIEVED DATA TO CROP MODEL DATA DISK

Once the output files have been created, their file names need to be written to the crop model data directory or disk. Input the drive and pathname of the directory used to store the retrieved files using the following procedures.

Floppy-disk Users

1. Remove the WEATHER DATA disk from the disk drive and insert the crop model DATA DISK into the drive.

2. Enter the drive and pathname of the subdirectory of the data disk (e.g. "B:\").

NOTE: The disk for the crop model data files could become full if approximately 8 or more Experiment and Weather data sets are added. You will need to make another copy of the original crop model DATA DISK and use it for additional experiments.

Hard-disk Users

1. If you want to write the retrieved data to a disk,

   a. Insert the disk in the proper drive.
   b. Enter the drive and pathname of the subdirectory of the data disk (e.g., "B:\").

2. If you want to write the retrieved data to a subdirectory on your hard disk, enter the drive and pathname of the subdirectory.

NOTE: If you are using a disk for the crop model data files, it could become full if approximately 8 or more Experiment and Weather data sets are added. You will need to make another copy of the original crop model DATA DISK and use it for additional experiments.

After the data has been written to the crop model DATA DISK, the retrieval process for weather data is completed.

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Table of Contents
SOIL DATA RETRIEVAL

Chapter 1
INTRODUCTION

PROGRAM DESCRIPTION

The Soil Data Retrieval for Crop Models program creates, from soil profile data, a model input file named SPROFILE.XX2 (where 'XX' is the crop identification code). These crop-specific SPROFILES and the data contained in them are required for DSSAT crop model simulations.

The Soil Data Retrieval program can create these SPROFILES by either retrieving soil profile data from the DSSAT soil data files or using soil data entered by the user with the keyboard. You thus have two options when using this program. You can choose to have the program either:

1. Search the DSSAT soil data files for a specific soil profile, retrieve it, and create a SPROFILE; or

2. Use data entered manually with the keyboard to create a SPROFILE.

Chapter 2
START THE PROGRAM

EXECUTE SOIL DATA RETRIEVAL PROGRAM

Hard-disk Users

To access the Soil Data Retrieval program from the DSSAT Shell, select option "R Retrieval" from the DBMS main menu and open the Retrieval menu. Then select "S Soil Data" to execute the Soil Data Retrieval program.

Floppy-disk Users

To access the Soil Data Retrieval program, insert the "Soil Data Retrieval for Crop Models" disk in drive A. At the DOS prompt A>, type GETSOIL and then press the <ENTER> key.

While the program is processing, DO NOT remove the program disk from the drive, unless instructed.

NOTE: All areas where users must enter a response are highlighted on the screen. Press the <ENTER> key to complete an entry.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

SOIL RETRIEVAL MENU

1 - Retrieve Data from DSSAT Soil Data Files
2 - Manually Input Data to Create SPROFILE

Select option:

<F1> for help
<ESC> to quit

MAIN MENU FOR SOIL DATA RETRIEVAL

The Soil Retrieval main menu presents two options. Select Option 1 to retrieve soil data from the DSSAT soil data files. Follow the instructions in Chapter 3 of this User's Guide.

Select Option 2 to manually input soil data and create SPROFILE. Follow the instructions in Chapter 4 of this User's Guide.

Chapter 3
RETRIEVE DATA FROM DSSAT SOIL DATA FILES

When Option 1 of the Soil Data Retrieval main menu is selected, the following screens will be presented.

To retrieve soil information from the DSSAT soil data files, the program uses information contained in an experiment data set previously entered into DSSAT by a user (see *DSSAT User's Guide–Experiment Data Entry*). The following screen allows you to select one of the experiment data sets stored in DSSAT. If you do not want to reference an experiment data set for soil profile data, use the <F10> key. In this case, go to the section entitled "Retrieve Soil Information" in this chapter and choose one of the three options found on the screen displayed there.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

Exp Master List

MAIZE IB WA 83 1

PgUp/PgDn-Scrolls Windows

Currently Selected MDS

Drv & Path ....>	D:\MAIZE\IB\WA\83\01
Exp. ID..........>	IB WA 83 1
Institute ....>	International Benchmark Sites
>	Network for Agrotechnology Transfer
Country ....>	U.S.A.
Experiment .. >	Maize cultivar by applied nitrogen
description ....>	fertility experiment cultivars are
>	Pioneer X304C and H610

Messages

<ENTER>	=	Continue with currently selected MDS.
<F1>	=	For help.
<F2>	=	Select Experiment by entering the drive and path.
<F10>	=	Skip Experiment selection.
<ESC>	=	Return to previous menu.

This screen has three main windows. In the left window, "Exp Master List" shows all the experiment data sets available in DSSAT. The top right window displays information on an experiment data set highlighted in the "Exp Master List." The bottom right window shows the key options available while in this screen.

EXPERIMENT SELECTION Select a data set from the "Master List" or enter the drive and path where the existing data set is located.

Hard-disk Users

To select an experiment from the "Master List," do the following.

Highlight the desired experiment by using the cursor movement keys and press the <ENTER> key. If no experiment filenames are in the DSSAT master list, the message [NO ITEMS IN LIST] will be displayed.

To select an experiment by entering the drive and path do the following.

Press the <F2> key. Enter the drive and pathname where an existing experiment resides.

DRIVE: The letter representing the drive where the experiment data are located (e.g., 'A').

PATHNAME: The pathname of the subdirectory where the experiment data are located. If you are not using subdirectories, then enter '\' for the root directory (e.g., '\' refers to the root directory; '\DATA' refers to the subdirectory DATA). If you are not sure what a pathname is, refer to your DOS manual.

Floppy-disk Users

To select a data set, do the following.

1. Insert EXPERIMENT DATA disk into an available drive. Press the <F2> key.

2. Enter the drive and pathname where the data set is located (see 'Drive' and 'Pathname' in the "Hard-disk Users" section above).

NOTE: The "Exp Master List" shown in the left window of the example screen will display the message [NO ITEMS IN LIST].

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

Messages

Retrieving Pedon number from MDS Form D
Pedon number : 82p736
Series name : Wahiawa
Classification : Clayey, kaolinitic, isohyperthermic, Tropeptic Eutrustox

Matching Pedon number NOT found in DSSAT Soil Data Files

1 - Select a particular Pedon Number
2 - Search for closest matching soil classification
3 - Search for a particular country

Select option:

<ESC> to quit <F1> for help

RETRIEVE SOIL INFORMATION

To access the selected soil profile in the DSSAT soil data files, the program uses the pedon number specified in Form D (see *DSSAT User's Guide–Experiment Data Entry*). The program will display the soil series name and the soil classification found in Form D of the selected experiment.

1. If a matching pedon number is found in the data files, press any key to continue, and the program will retrieve the soil information from the data files. Turn to Chapter 5 of this User's Guide to continue.

2. If a matching pedon number is not found, choose one of the following three options displayed in the above screen to search the data files for the soil you want to retrieve.

a. To select a soil by pedon number, choose Option 1. See the following section entitled "Select by Pedon Number" in this chapter.

b. To search for the closest matching soil classification, choose Option 2. Turn to the section entitled "Search by Soil Classification" in this chapter.

c. To search for soils from a particular country, choose Option 3. Turn to the section entitled "Search by Country" in this chapter.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

Select Soil Sampling YEAR :

1978	1979	1981	1982
1983	1984	1985	1986
UNKNOWN			

<ESC> to quit

OPTION 1- SELECT BY PEDON NUMBER

If you chose Option 1, this screen will be presented. You must now manually select the soil information you wish to retrieve from the data files to run the crop models.

1. Press the <ESC> key if you wish to return to the option screen.

2. To select a soil profile, use the ↓ and ↑ arrow keys to select the year that

the soil was sampled or select UNKNOWN if you do not know the sampling year.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

Select soil Sampling YEAR: (<ESC> to quit)

1978	1979	1981	1982
1983	1984	1985	1986
UNKNOWN			

Options:
<ESC> to select another YEAR
<PgUp> to go to PREVIOUS pedons
<PgDn> to go on to the NEXT pedons
<ENTER> to SELECT highlighted PEDON
< ↑ > to move highlight UP
< ↓ > to move highlight DOWN

7800167
7800168
7800169
7800170
7800171
7800172
7800173
7800223
7800224
↓ 7800225

KENYA: very fine, mixed, isothermic Oxic Rhodustalf

Selecting a Pedon Number

After selecting the year of sampling, the pedon numbers of all profiles sampled during that year are displayed in the right-hand boxed window. The boxed window at the bottom of the screen displays the country and classification of the soil profile associated with the selected pedon number.

Move the highlight bar using the ↑ and ↓ arrow keys and press the <ENTER> key once the pedon number of the profile you wish to retrieve is highlighted by the highlight bar.

Go to the section entitled, "Complete the Retrieval" in this chapter.

NOTE: If the country name is missing or the classification is unknown, this is probably because the profile record has a blank country-code field or is missing data *in all of the classification code fields.*

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

Enter Soil Classification:
FINE, MIXED, ISOHYPERTHERMIC OXIC PALEUSTALF

Parsing classification . . .

Search DSSAT Data Files using this classification? (Y/N) **Y**

Messages

<ESC> to quit <F1> for help

OPTION 2- SEARCH BY SOIL CLASSIFICATION

This is the screen that will be displayed if you chose Option 2. The program uses the soil classification found in Form D of the specified experiment data set to give the initial description for the search classification. Make any changes to this description by typing your description over the classification displayed on the screen. Press the <ENTER> key when you have finished making changes to the search classification.

NOTE: The soil classification must use the Soil Conservation Service's (SCS) terminology.

Type 'Y' to search the soil data files by soil classification.

Type 'N' to enter a different soil classification.

SOIL DATA RETRIEVAL FOR CROP MODELS Version 2.1

Enter Soil Classification:

FINE, MIXED, ISOHYPERTHERMIC OXIC PALEUSTALF

Parsing classification. . .

Search DSSAT Data files using this classification? (Y/N) Y

Messages

Searching DSSAT Soil Data files . . .
Number of soils of the Alfisol order = 74

Do you want to see theses profiles? (Y/N)

Searching the Data Files

The program searches by soil classification using a process of elimination. This process begins by matching the Soil Order found in the soil classification box in the above screen with those pedons in the DSSAT soil data files having the same Soil Order.

To see a listing of the remaining soil profiles, type 'Y'.

Otherwise, type 'N' and the search will continue.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

Enter Soil Classification:

FINE, MIXED, ISOHYPERTHERMIC OXIC PALEUSTALF

Parsing classification. . .

Search DSSAT Data files using this classification? (Y/N) Y

Messages

Searching DSSAT Soil Data files . . .
Number of soils of the Alfisol order = 74
Number or remaining soils: 59
Number of remaining soils: 29

Do you want to see these profiles? (Y/N)

Continuing Data File Search

The program continues matching profiles using the following criteria in the order given: Suborder, Great group, Sub-group modifier, Texture, Mineralogy, Reaction, and Temperature regime. At each step of the elimination process, type 'Y' to view the remaining profiles. When 32 or less profiles remain, you may stop the elimination process at any time.

Type 'Y' to continue the elimination process with the next search criteria.

Type 'N' if you do not want to continue the elimination process.

NOTE: The program will terminate its search if the next step of the process eliminates the remaining profiles.

Desired classification:
FINE, MIXED, ISOHYPERTHERMIC OXIC PALEUSTALF

Options :
<ESC> to QUIT
<PgUp> to go to PREVIOUS pedons
<PgDn> to go on to the NEXT pedons
<ENTER> to SELECT highlighted PEDONS
<↑> to move highlight UP
<↓> to move highlight DOWN

7800169
7800171
7800231
7800233
7800240
7800241
7800244
7800246
7800325
↓ 8100220

KENYA: fine-loamy, kaolinitic, isothermic Ultic Paleustalf

Selecting a Pedon Number

When all matching profiles have been found, their pedon numbers are displayed on the screen. Highlighting a pedon number displays, in the b at the bottom of the screen, the soil classification for that number.

Use the ↑ and ↓ arrow keys to move the highlight bar and select the pedc number of the profile you wish to retrieve.

Press the <ENTER> to retrieve the profile.

Go to the section entitled, "Complete the Retrieval" in this chapter.

NOTE: If the country name is missing or the classification is unknown, this is probably because the profile record has a blank country-code field or is missing d in all of the classification code fields.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

Enter Name of Country to search for:

KENYA

<ESC> to quit <F1> for help

OPTION 3- SEARCH BY COUNTRY

This is the screen that will be displayed if you chose Option 3.

SELECTING A COUNTRY

Enter the name of the country for which you want soil data retrieved.

NOTE: You may enter a partial country name if you do not know the complete country name.

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Validating Country Name

After the country name is entered, the program searches its country-code file to determine if the name is valid. If the country name that you entered matches or is a close match to a country listed in the country-code file, the program will display the message shown in the following dialog box. For exact matches, the program will not display the following dialog window.

```
Country:    Kenya
Code:       505

Is this the correct country?    (Y/N)  N
```

If the located country is correct, type the 'Y' key.

If the located country is not correct, type the 'N' key. The program will search for the next possible match and then prompt you again.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

Enter Name of Country to search for :
KENYA

Options:
<ESC> to select another COUNTRY
<PgUp> to go to PREVIOUS pedons
<PgDn> to go on to the NEXT pedons
<ENTER> to SELECT highlighted PEDON
<↑> to move highlight UP
<↓> to move highlight DOWN

7800167
7800168
7800169
7800170
7800171
7800172
7800173
7800223
7800224
↓ 7800225

KENYA: Very fine, mixed, isothermic Oxic Rhodustalf

Selecting a Pedon Number

The program searches for the first soil profile from the specified country and then displays all pedon numbers for this country. Highlighting a pedon number displays, in the box at the bottom of the screen, the soil classification for this number.

Use the ↑ and ↓ arrow keys to move the highlight bar and select the pedon number of the profile you wish to retrieve.

Press the <ENTER> key to retrieve a profile.

Go to the section entitled, "Complete the Retrieval" in this chapter.

NOTE: *If the classification is unknown, this is probably because the profile record is missing data in all of the classification code fields.*

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

Retrieving. . .

Country	:	KENYA
Latitude	:	Missing
Longitude	:	Missing
Pedon No.	:	7800167
Name	:	very fine, mixed, isothermic Oxic Rhodustalf

Exiting Retrieval. . .

Messages

*** WARNING - Unable to determine color :

Process Successfully Completed . . .

COMPLETE THE RETRIEVAL

Go to Chapter 5 in this User's Guide for an explanation of how to use the retrieved data to create SPROFILE.

During profile retrieval, warning and/or error messages are generated and displayed at the bottom of the screen in the message area.

NOTE: Although warning and error messages may occur during retrieval processing, the program will still produce a soil output file. The resulting output file will contain whatever valid information was contained in the selected soil profile from the DSSAT soil data files, and this file may be used to create a SPROFILE.

Chapter 4
MANUALLY-ENTERED SOIL DATA

This chapter explains how to create a Soil Profile or SPROFILE by manually entering data. If you are using this entry procedure (i.e., selected Option 2 from the Soil Data Retrieval main menu), it is assumed that you have soil profile information in hard-copy format and want to manually enter the data from the keyboard.

Type 'Y' when the first screen appears if you have this data at hand. Otherwise, type 'N' to end the program.

SOIL DATA INPUT GUIDELINES

The following guidelines may be helpful during manual soil information data entry.

1. In each of the input screens that follow, you may press the <ESC> key before entering data to abort the manual input process. If you quit before completing the manual input process, any data already entered will not be saved, and you will be given the option of starting over and creating a new SPROFILE.

2. The program allows you to correct data input errors after data entry for a section is completed, but not **during** data entry.

For example, if you enter an incorrect value (e.g., '3.2') for the pH value of layer 3, complete data entry for the pH values of the rest of the layers and when the program prompts with:

"Are these values OK?   (Y/N)"

type 'N' and press the <ENTER> key. The program will prompt with:

"Enter layer number of value you wish to change (0 for ALL)"

Type in the layer number ('3' in our example for pH) or '0' if you wish to change all the values entered, enter the correct value(s), and press the <ENTER> key.

3. After error checking the input data, the program will display current

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input data that will be used in the calculations. The program will then prompt you with:

"Do you want to make changes to input data?" (Y/N)

If you discover that there are some errors and you wish to change any or a of the input data, type 'Y' and press the <ENTER> key. Otherwise, type 'N and press the <ENTER> key to begin calculations.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

Input Data used to create SPROFILE.XX2 :

INPUT	VARIABLE(S) CALCULATED
Lower/Upper depths for each layer (cm)	SWCON2, WR
% Sand	LL, DUL, SAT, SALB, U
% Clay	LL, DUL, SAT, SALB, U
% Silt	LL, DUL, SAT, SALB, U
Bulk Dens. 1/3 bar (g/cm3)	LL, DUL, SAT, SWCON, WR
Organic carbon	LL, DUL, SAT, SALB
Coarse fraction > 2 mm, % of whole soil	LL, DUL, SAT
pH-H2O of soil	WR
Al saturation (cm3/cm3)	WR
Soil Classification	CN2
Soil horizons	CN2
Root abundance information	WR
Slope	CN2
Soil color	SALB
Permeability code	CN2
Drainage code	SWCON

Press any key to continue

INPUT/ CALCULATED VARIABLES This screen specifies the input data (left-hand column) the program requires to correctly calculate the given variables listed in the right-hand column. You may enter default values for any missing input data values, but the calculated output values may not be correct.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

AR - Aroid	PT - Potato
CS - Casssava	RI - Rice
BN - Dry Bean	SB - Soybean
MZ - Maize	SG - Sorghum
ML - Millet	WH - Wheat
PN - Peanut	

Enter Crop code (XX)

<ESC> to quit

SELECT A CROP CODE

Enter the crop code of the crop model for which the SPROFILE is being created.

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MANUAL DATA INPUT

Enter Pedon Number : **82PO367**
Enter Soil Classification :
coarse-loamy, siliceous, isohyperthermic typic natrustalf
Enter Number of layers in profile : **7**

Are these values OK? (Y/N) **N**

<ESC> to quit

SOIL PROFILE INPUT DATA

Enter the pedon number, the soil name or classification, and the number of layers in the profile.

MANUAL DATA INPUT

Enter % Slope (##) : **1**

Color codes :	BN - brown	R - red	BK - black
	G - gray	Y - yellow	YR - yellow-red

Enter color of top soil layer (def. = BN) : **BN**

Are these values OK? (Y/N) **Y**

<ESC> to quit

SLOPE AND COLOR Enter slope and soil color. For slope, enter a percentage between 0 and 99. For color information, enter the code letters corresponding to the color of the top layer of the soil.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

MANUAL DATA INPUT

Perm.	1 - very slow	2 - slow	3 - mod. slow
codes:	4 - moderate	5 - mod. rapid	6 - rapid
	7 - very rapid	0 - not permeable/unknown	

Enter Permeability Code of soil : **4**

Are these values OK? (Y/N) **Y**

<ESC> to quit

PER-MEABILITY Enter the code number corresponding to the permeability class of the soil (e.g., enter '4' for "moderate").

MANUAL DATA INPUT

Drain. codes:	1 - very poorly	2 - poorly	3 - somewhat poorly
	4 - mod. well	5 - well	6 - somewhat excessively
	7 - excessively	0 - unknown / missing	

Enter Drainage Code of soil: **5**

Are these values OK? (Y/N) **Y**

<ESC> to quit

DRAINAGE Enter the code number corresponding to the drainage class of the soil (e.g., enter '5' for "well").

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MANUAL DATA INPUT

Enter Thickness (cm) of layer # 1 (###) : **13**
Enter Thickness (cm) of layer # 2 (###) : **17**
Enter Thickness (cm) of layer # 3 (###) : **32**
Enter Thickness (cm) of layer # 4 (###) : **22**
Enter Thickness (cm) of layer # 5 (###) : **16**
Enter Thickness (cm) of layer # 6 (###) : **40**
Enter Thickness (cm) of layer # 7 (###) : **40**

<ESC> to quit

SOIL LAYER DEPTHS

Enter the thickness, in cm., of each layer. With this information, the program calculates the upper and lower depths associated with each soil layer. Sample values are displayed in the above screen. Using these sample values, the program would display a screen listing the layer thickness as follows:

Layer #1:	0	-	13	cm
Layer 2:	13	-	30	cm
Layer 3:	30	-	62	cm
Layer 4:	62	-	84	cm
Layer 5:	84	-	100	cm
Layer 6:	100	-	140	cm
Layer 7:	140	-	180	cm

NOTE: For the layer thickness, you must re-enter all of the values if you wish to change any one of them.

MANUAL DATA INPUT

Note: Enter ## - if unknown/blank/missing horizon designation

Enter Horizon Designation for layer # 1 (XX) : **ap**
Enter Horizon Designation for layer # 2 (XX) : **ap**
Enter Horizon Designation for layer # 3 (XX) : **ba**
Enter Horizon Designation for layer # 4 (XX) : **ba**
Enter Horizon Designation for layer # 5 (XX) : **bt**
Enter Horizon Designation for layer # 6 (XX) : **bt**
Enter Horizon Designation for layer # 7 (XX) : **bt**

<ESC> to quit

SOIL HORIZONS

Enter the soil horizons associated with each layer.

NOTE: Enter only the first two characters of the horizon designation.

MANUAL DATA INPUT

```
Enter % Clay for layer # 1 (###.#) :   3.2
Enter % Clay for layer # 2 (###.#) :   8.5
Enter % Clay for layer # 3 (###.#) :  10.5
Enter % Clay for layer # 4 (###.#) :   8.9
Enter % Clay for layer # 5 (###.#) :  12.5
Enter % Clay for layer # 6 (###.#) :  12.6
Enter % Clay for layer # 7 (###.#) :  14.5
```

<ESC> to quit

CLAY CONTENT Enter the percentage clay content, from 0 to 100, for each soil layer.

MANUAL DATA INPUT

```
Enter % Silt for layer # 1 (###.#) :  18.9
Enter % Silt for layer # 2 (###.#) :  14.1
Enter % Silt for layer # 3 (###.#) :  16.1
Enter % Silt for layer # 4 (###.#) :  17.5
Enter % Silt for layer # 5 (###.#) :  17
Enter % Silt for layer # 6 (###.#) :  18.5
Enter % Silt for layer # 7 (###.#) :  16.2
```

<ESC> to quit

SILT CONTENT Enter the percentage silt content, from 0 to 100, for each soil layer.

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MANUAL DATA INPUT

	% Clay	% Silt	% Sand
Layer 1	3.2	18.9	77.9
Layer 2	8.5	14.1	77.4
Layer 3	10.5	16.1	73.4
Layer 4	8.9	17.5	73.6
Layer 5	12.5	17.0	70.5
Layer 6	12.6	18.5	68.9
Layer 7	14.5	16.2	69.3

Press any key to continue

<ESC> to quit

SAND CONTENT The program will compute the percentage sand content for each soil layer from the clay and silt values entered. (It assumes that all three componen sum to 100 percent.)

MANUAL DATA INPUT

Note: Enter '-9' for unknown/blank/missing values

Enter Coarse Fractions > 2 mm for layer # 1 (###) : 0
Enter Coarse Fractions > 2 mm for layer # 2 (###) : 0
Enter Coarse Fractions > 2 mm for layer # 3 (###) : 0
Enter Coarse Fractions > 2 mm for layer # 4 (###) : 0
Enter Coarse Fractions > 2 mm for layer # 5 (###) : 0
Enter Coarse Fractions > 2 mm for layer # 6 (###) : 0
Enter Coarse Fractions > 2 mm for layer # 7 (###) : 0

COARSE FRACTIONS Enter the volume fraction percentage, from 0 to 100 of stone, coral, or hard rock for each layer.

MANUAL DATA INPUT

Note: Enter '-9' for unknown/blank/missing values

Enter % ORGANIC CARBON (Walkley-Black) for layer # 1 (##.##) : .42
Enter % ORGANIC CARBON (Walkley-Black) for layer # 2 (##.##) : .32
Enter % ORGANIC CARBON (Walkley-Black) for layer # 3 (##.##) : .17
Enter % ORGANIC CARBON (Walkley-Black) for layer # 4 (##.##) : .13
Enter % ORGANIC CARBON (Walkley-Black) for layer # 5 (##.##) : .17
Enter % ORGANIC CARBON (Walkley-Black) for layer # 6 (##.##) : .15
Enter % ORGANIC CARBON (Walkley-Black) for layer # 7 (##.##) : .13

<ESC> to quit

ORGANIC CARBON Enter tne organic carbon content percentage, from 0 to 100, for each soil layer.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

MANUAL DATA INPUT

Note: Enter '-9' for unknown/blank/missing values

Enter Bulk Density 1/3 bar for layer # 1 (##.##) :	**1.66**
Enter Bulk Density 1/3 bar for layer # 2 (##.##) :	**1.68**
Enter Bulk Density 1/3 bar for layer # 3 (##.##) :	**1.58**
Enter Bulk Density 1/3 bar for layer # 4 (##.##) :	**1.55**
Enter Bulk Density 1/3 bar for layer # 5 (##.##) :	**1.76**
Enter Bulk Density 1/3 bar for layer # 6 (##.##) :	**1.63**
Enter Bulk Density 1/3 bar for layer # 7 (##.##) :	**1.57**

<ESC> to quit

BULK DENSITY

Enter the bulk density, as g/cm^3, for each soil layer.

MANUAL DATA INPUT

Note: Enter '-9' for unknown/blank/missing values

Enter pH	1:1	in	water	for layer #	1	(##.##)	:	**5.6**
Enter pH	1:1	in	water	for layer #	2	(##.##)	:	**5.1**
Enter pH	1:1	in	water	for layer #	3	(##.##)	:	**4.7**
Enter pH	1:1	in	water	for layer #	4	(##.##)	:	**5.4**
Enter pH	1:1	in	water	for layer #	5	(##.##)	:	**6.7**
Enter pH	1:1	in	water	for layer #	6	(##.##)	:	**9**
Enter pH	1:1	in	water	for layer #	7	(##.##)	:	**8.7**

<ESC> to quit

pH in H_2O Enter the pH of the soil in water for each soil layer.

MANUAL DATA INPUT

Note: If pH > 5.5, then Al = 0
Enter '-9' for unknown/blank/missing values

Enter	%	Al	Saturation	for	layer	#	1	(###)	:	0
Enter	%	Al	Saturation	for	layer	#	2	(###)	:	0
Enter	%	Al	Saturation	for	layer	#	3	(###)	:	0
Enter	%	Al	Saturation	for	layer	#	4	(###)	:	0
Enter	%	Al	Saturation	for	layer	#	5	(###)	:	0
Enter	%	Al	Saturation	for	layer	#	6	(###)	:	0
Enter	%	Al	Saturation	for	layer	#	7	(###)	:	0

<ESC> to quit

ALUMINUM SATURATION Enter the aluminum saturation of each soil layer.

NOTE: If the pH of a particular layer is greater than 5.5, then the program will not prompt for the aluminum saturation value for that corresponding layer.

MANUAL DATA INPUT

Note: For this section of data input, you need soil profile descriptive information.

VF -	very few	FF -	very few to few	F -	Few
FC -	few to common	C -	common	CM -	common to many
M -	many	MT -	matted	N -	no roots
## -	blank / missing				

Enter Root Quantity code for layer 1 (0 - 13 cm) (XX) : C

ROOT QUANTITY INFORMATION

Enter the quantity of roots in each soil layer. For each layer, enter the appropriate code from those listed at the top of the screen (e.g., enter 'C' for "common").

From this point on, the manual data entry procedures are the same as the described in Chapter 5 of this User's Guide. Proceed to Chapter 5 and th section entitled "Nitrogen Data."

Chapter 5
CREATE A SOIL PROFILE

This chapter explains how to create a Soil Profile using data retrieved from the DSSAT soil data files (Chapter 3) or from data inputted by the user (Chapter 4). The Soil Profile created is saved to a model input file called SPROFILE.XX2, where "XX" is the crop code.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

AR - Aroid	PT - Potato
CS - Cassava	RI - Rice
BN - Dry Bean	SB - Soybean
MZ - Maize	SG - Sorghum
ML - Millet	WH - Wheat
PN - Peanut	

Enter Crop code (XX) :

<ESC> to exit

SELECT A CROP CODE

If you have retrieved data from the DSSAT soil data files (Chapter 3), the above screen will be displayed and you will be prompted for the crop code of the crop model for which the SPROFILE is being created. Press the <ESC> key if you wish to exit the program. If you entered the soil data manually (Chapter 4), the next screen will appear.

*** OTHER INFORMATION ***

NOTE: The following information is required for the NITROGEN component of the models.
Press <ENTER> to accept DEFAULT values.

Enter Annual average ambient temp. (default = 20) : **20.0**
Enter Annual amplitude in mean monthly temp. (def. = 0° C) : **0**
Enter Zero-to-unity factor for mineralization (def. = 1) : **1**

<ESC> to quit

NITROGEN DATA

Enter the requested values; these data are required by the nitrogen component of the models. Change the default values by typing a value and pressing the <ENTER> key.

SOIL DATA RETRIEVAL FOR CROP MODELS Version 2.1

*** CHECKING INPUT DATA ***

checking : % CLAY, % SAND, % SILT...
checking : Organic Carbon...
checking : Bulk Density 1/3 bar...
checking : Coarse Fractions > 2mm...

<ESC> to quit

DATA ERROR CHECKING

The program checks for errors (i.e., missing data values used to calculate variables) in the retrieved or input data.

If the values shown in the above screen cannot be calculated because of missing data, the program will try to estimate them using other available data. If it cannot, the program will prompt you to enter a value.

*** INPUT DATA ***

Pedon number = 82PO367
Taxon = COARSE-LOAMY, SILICEOUS, ISOHYPERTHERMIC TYPIC NATRUSTALF

Slope = 1 %
Color = BN
Permeability code = 4
Drainage code = 5

Tav = 20.000000 Amp = 0.000000 Dmod = 1.000000

Press any key to continue

Error-checked Data

Before variables are calculated from the retrieved or input data, four screens displaying these error-checked data are presented. This is the first screen of error-checked data.

Tav - Annual average ambient temperature
Amp - Annual amplitude in mean monthly temperature
Dmod - Zero-to-unity factor for mineralization

*** INPUT DATA ***

Layer	Upper	Lower	Horizon	Clay	Silt	Sand
1	0	13	AP	3.2	18.9	77.9
2	13	30	AP	8.5	14.1	77.4
3	30	62	BA	10.5	16.1	73.4
4	62	84	BA	8.9	17.5	73.6
5	84	100	BT	12.5	17.0	70.5
6	100	140	BT	12.5	18.5	68.9
7	140	180	BT	14.5	16.2	69.3

Press any key to continue

This is the second screen of error-checked data.

*** INPUT DATA ***

Layer	% Stone	OC	BD 1/3 bar	Al SAT	pH in H2O
1	0.0	0.42	1.66	0.0	5.6
2	0.0	0.32	1.68	0.0	5.1
3	0.0	0.17	1.58	0.0	4.7
4	0.0	0.13	1.55	0.0	5.4
5	0.0	0.17	1.76	0.0	6.7
6	0.0	0.15	1.63	0.0	9.0
7	0.0	0.13	1.57	0.0	8.7

Press any key to continue

This is the third screen of error-checked data.

OC - Organic Carbon
BD - Bulk Density
Al SAT- Aluminum Saturation

*** INPUT DATA ***

Layer	Root Quantity Code
1	C
2	F
3	F
4	F
5	F
6	FF
7	

Do you want to make changes to input data? (Y/N) **N**

This is the fourth screen of error-checked data. At this point, you may change any or all of the data.

If you choose 'Y', the following screen will appear.

If you choose 'N', go to the section entitled "Calculated Data" in this chapter.

MANUAL DATA EDIT

1. - Slope/Color	2. - Permeability	3. - Drainage
4. - Layer Depths	5. - Horizon Design	6. - Sand, Silt, Clay
7. - Coarse Frac.	8. - Organic Carbon	9. - Bulk Density
10. - pH in water	11. - Aluminum Sat.	12. - Root Quan.

Select variable to edit by number (0 - quit): **0**

Final Data Editing

From the Manual Data Edit menu, choose the input variable value(s) you wish to change by selecting the corresponding number. The screens presented after entering a number will be those previously presented for that variable.

Enter zero (0) when all values are correct. The program will then begin variable data calculations.

*** Beginning CALCULATIONS ***

Calculating Soil Water Content Values. . .

Layer	#	1	:	LL	=	0.052737	DUL	=	0.169387	SAT	=	0.296600
Layer	#	2	:	LL	=	0.053312	DUL	=	0.171228	SAT	=	0.309597
Layer	#	3	:	LL	=	0.076278	DUL	=	0.183114	SAT	=	0.316859
Layer	#	4	:	LL	=	0.069708	DUL	=	0.177139	SAT	=	0.313949
Layer	#	5	:	LL	=	0.084528	DUL	=	0.191868	SAT	=	0.322452
Layer	#	6	:	LL	=	0.084962	DUL	=	0.193020	SAT	=	0.324221
Layer	#	7	:	LL	=	0.092766	DUL	=	0.199787	SAT	=	0.325858

Press any key to continue

CALCULATED DATA

Soil Water Contents

The soil water content values are printed on the screen as they are calculated.

LL - Lower Limit
DUL - Drain Upper Limit
SAT - Saturation

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```
Calculating WR. . .
*** WARNING - no root quantity information for layer 7, estimating WR
    Layer # 1 : WR = 0.50
    Layer # 2 : WR = 0.20
    Layer # 3 : WR = 0.20
    Layer # 4 : WR = 0.20
    Layer # 5 : WR = 0.20
    Layer # 6 : WR = 0.15
    Layer # 7 . WR = 0.04


Press any key to continue
```

Root Growth Weighing Factor

The program calculates WR, the weighing factor used to determine new root growth, using two methods. One method uses root abundance infor-mation, if any, and a table to determine WR values for each layer. The other method uses a formula based on the depth of each soil layer and is further modified depending on the values given for soil pH and Al satura-tion for each layer.

If the root abundance information is not in the retrieved data or has not been inputted for a certain layer, the second method to estimate WR for that layer will be used.

```
Calculating SALB. . .
     Color      :   BN
     SALB       =   0.150000
Calculating SWCON. . .
     Drainage code  :   5
     SWCON          =   0.428708
Calculating SWCON2
     SWCON2         =   102.156525
Calculating U. . .
     U          =       9.000000
```

Press any key to continue

SALB, U, SWCON, SWCON2, CN2

The program calculates values for Bare Soil Albedo (SALB), Upper Limit of Stage 1 Soil Evaporation (U), Soil Water Drainage Constant (SWCON), SWCON2, and Runoff Curve Number (CN2).

```
Calculating CN2...
***WARNING-Unable to get Subgroup from soil classification
***WARNING-Unable to determine soil group, default group=B
    Soil group :        B
    CN2        =        76.000000
Checking layer depths...
maximum layer depth           :     160
original number of layers     :     7
    splitting  :        first layer into a 5 cm and a 5 cm layer
    splitting  :        31 cm layer depth into 2 layers
    current number of layers  =     13
    splitting  :        35 cm layer depth into 2 layers
    current number of layers  =     14

***CALCULATIONS Completed***


Press any key to continue
```

LAYER DEPTHS

The program checks the thickness of each layer in the profile, setting the first layer to, at most, 5 cm in depth.

PROFILE ≤ 200 CM. If the maximum depth of the profile is less then or equal to 200 cm, the program checks layers between 5 (or less) cm and 60 cm. If a layer is found that has a thickness greater than 15 cm, the program divides, as evenly as possible, every such layer into equal layers each less than 15 cm. At depths greater than 60 cm, if a layer is thicker than 30 cm, it will be divided as evenly as possible into equal layers of less than 30 cm. The values associated with layers that are divided are stored in each of the new layers.

PROFILE ≥ 200 CM. The program checks layers between 5 (or less) cm and 50 cm. If a layer is found that has a thickness greater than 20 cm, the program divides, as evenly as possible, the layer into equal layers each less than or equal to 20 cm. For layers between 50 and 100 cm, division will be into layers no greater than 30 cm thick. For layers between 100 and 200 cm, division will be into layers no greater than 50 cm thick. For layers at a depth greater than 200 cm, division will be into layers no greater than 100 cm thick. The values associated with layers that are divided are stored in each of the new layers.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

*** Writing OUTPUT file ***

0 82PO367 COARSE-LOAMY, SILICEOUS, ISOHYPERTHERMIC TYPIC NATRUSTALF

0.13	8.26	0.60	76.00	27.0	0.0	1.0	1.32e-003	100.6	6.67	0.04	1.00
5	0.057	0.183	0.296	0.183	0.500	1.66	0.42	-9.0	-9.0	5.6	-9.0
8	0.057	0.183	0.296	0.183	0.500	1.66	0.42	-9.0	-9.0	5.6	-9.0
8	0.058	0.186	0.310	0.186	0.200	1.68	0.32	-9.0	-9.0	5.1	-9.0
9	0.058	0.186	0.310	0.186	0.200	1.68	0.32	-9.0	-9.0	5.1	-9.0
10	0.083	0.199	0.317	0.199	0.200	1.58	0.17	-9.0	-9.0	4.7	-9.0
10	0.083	0.199	0.317	0.199	0.200	1.58	0.17	-9.0	-9.0	4.7	-9.0
12	0.083	0.199	0.317	0.199	0.200	1.58	0.17	-9.0	-9.0	4.7	-9.0
11	0.076	0.192	0.314	0.192	0.200	1.55	0.13	-9.0	-9.0	5.4	-9.0
11	0.076	0.192	0.314	0.192	0.200	1.55	0.13	-9.0	-9.0	5.4	-9.0
16	0.092	0.208	0.322	0.208	0.200	1.76	0.17	-9.0	-9.0	6.7	-9.0
20	0.092	0.209	0.324	0.209	0.150	1.63	0.15	-9.0	-9.0	9.0	-9.0
20	0.092	0.209	0.324	0.209	0.150	1.63	0.15	-9.0	-9.0	9.0	-9.0
20	0.101	0.217	0.326	0.217	0.041	1.57	0.13	-9.0	-9.0	8.7	-9.0

Do you want to add this new PROFILE to the current file? (Y/N) Y

SAVE SPROFILE

The program displays the created SPROFILE and its calculated variable values.

Type 'Y' to save the SPROFILE and press the <ENTER> key.

Or, type 'N' and press the <ENTER> key. The values will NOT be saved.

Save as Existing SPROFILE.XX2

If you choose to save the profile and the file SPROFILE.XX2 already exists, then:

1. If there is another profile in the existing file with the same pedon number as the current one, the program will ask if you want to append the newly created profile to the current file.

If you type 'N', the program saves the profile in a temporary file called SPROFILE.DUP. The duplicate profile will remain there until another duplicate profile is created.

If you type 'Y', the program will search the rest of the existing SPROFILE.XX2 file and each time it encounters a profile with the same pedon number as the current one, it will ask if you want to append the current profile to the existing SPROFILE. If you type 'Y' at each such prompt, the program will append the new profile to the end of the existing SPROFILE.XX2 file.

2. If there are no duplicate profiles found, the program will append the new profile to the end of the existing SPROFILE.XX2 file.

SOIL DATA RETRIEVAL FOR CROP MODELS **Version 2.1**

File : C:\DSSAT\MODEL\MAIZE\DATA\SPROFILE.MZ2
not found, creating. . .

*** Output completed, File closed ***

Press any key to continue

Save as new SPROFILE.XX2

If you chose to save the profile and the file SPROFILE.XX2 does NOT already exist, then the program will create the file called SPROFILE.XX2 and store the SPROFILE there.

*** Output completed, File closed ***

Do you wish to create another SPROFILE? (Y/N) Y

QUIT After processing for the current soil profile has been completed, you will be asked if you want to create another soil profile.

Type 'Y' to begin the program again.

Type 'N' to return to the DSSAT main menu.

CHAPTER 6
OUTPUT SPECIFICATIONS

OUTPUT

The program creates the model input file, SPROFILE.XX2. The file format is as specified in IBSNAT TR5, version 1.0. See Appendix A of this document for format specifications and an example of a SPROFILE.

ERROR/ WARNING MESSAGE REPORT

During the calculations required to create the model input file, SPROFILE.XX2, the program may discover that some of the input data required are either missing or invalid. The program will display error messages to notify the user of these deficiencies as well as create an Error/ Warning Message Report ASCII File in the default directory called REPORT.ERR. For an example of this Error/Warning Message Report File see Appendix B.

NOTE: REPORT.ERR is over-written everytime the program is executed, so if you wish to save the information in it, you must make a copy of it or rename it.

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Appendix A
SPECIFICATIONS FOR SPROFILE

SPROFILE File Output Format: (See also IBSNAT TR5, FILE2)

Variable	Column	Format	Description
Line 1:			
IDUMSL	2 - 3	I2	Sequence Number
PEDONUM	5 - 16	A12	Site location or SCS Pedon Number
TAXON	18 - 77	A60	Soil classification, full soil family name
Line 2:			
SALB	1 - 6	F6.2	Bare soil albedo
U	8 - 12	F5.2	Upper limit of stage 1 soil evaporation
SWCON	14 - 19	F6.2	Soil water drainage constant
CN2	21 - 26	F6.2	SCS curve number used to calculate daily runoff
TAV	28 - 32	F5.1	Annual ave. ambient temp. (default = 20)
AMP	34 - 38	F5.1	Annual amp. in mean monthly temp. (default = 0)
DMOD	40 - 42	F3.1	Zero-to-unity factor (default = 1)
SWCON1	44 - 52	E9.2	Coefficient in the steady state solution to the radial flow (default = 0.00132)
SWCON2	54 - 59	F6.1	Coefficient in the steady state solution to the radial flow
SWCON3	61 - 65	F5.2	Coefficient in the steady state solution of the radial flow (default = 6.67)
RWUMX	67 - 71	F5.2	Maximum daily root water uptake per unit root length (default = 0.04)
PHFAC3	73 - 76	F4.2	Variable to reduce apparent photosynthesis attributed to soil fertility (default = 1.00)
Line 3 - N:			
DLAYR(L)	1 - 6	F6.0	Thickness of soil layer
LL(L)	7 - 13	F7.3	Lower limit of plant-extractable soil water
DUL(L)	14 - 20	F7.3	Drained upper limit soil water content
SAT(L)	21 - 27	F7.3	Saturated water content
SW(L)	28 - 34	F7.3	Default initial soil water content (using DUL)
WR(L)	35 - 41	F7.3	Weighing factor
BD(L)	42 - 47	F6.2	Moist bulk density of soil
OC(L)	48 - 53	F6.2	Organic carbon concentration
NH4(L)	54 - 58	F5.1	Default soil ammonium in soil layer
NO3(L)	59 - 63	F5.1	Default soil nitrate in soil layer
PH(L)	65 - 68	F4.1	Default pH of soil in soil layer
SWCN(L)	69 - 73	F4.1	Saturated soil hydraulic conductivity

Sample of SPROFILE.SB2

```
1   82P0367     Coarse-loamy, siliceous, isohyperthermic typic natrustalf
0.13     8.26     0.60   76.00    27.0      0.0    1.0      1.32e-003  100.6     6.67   0.04    1.00
  5      0.057    0.183  0.296    0.183     0.500           1.66   0.42    -9.0  -9.0   5.6      -9.0
  8      0.057    0.183  0.296    0.183     0.500           1.66   0.42    -9.0  -9.0   5.6      -9.0
  8      0.058    0.186  0.310    0.186     0.200           1.68   0.32    -9.0  -9.0   5.1      -9.0
  9      0.058    0.186  0.310    0.186     0.200           1.68   0.32    -9.0  -9.0   5.1      -9.0
 10      0.083    0.199  0.317    0.199     0.200           1.58   0.17    -9.0  -9.0   4.7      -9.0
 10      0.083    0.199  0.317    0.199     0.200           1.58   0.17    -9.0  -9.0   4.7      -9.0
 12      0.083    0.199  0.317    0.199     0.200           1.58   0.17    -9.0  -9.0   4.7      -9.0
 11      0.076    0.192  0.314    0.192     0.200           1.55   0.13    -9.0  -9.0   5.4      -9.0
 11      0.076    0.192  0.314    0.192     0.200           1.55   0.13    -9.0  -9.0   5.4      -9.0
 16      0.092    0.208  0.326    0.208     0.200           1.76   0.17    -9.0  -9.0   6.7      -9.0
 20      0.092    0.209  0.324    0.209     0.150           1.63   0.15    -9.0  -9.0   9.0      -9.0
 20      0.092    0.209  0.324    0.209     0.150           1.63   0.15    -9.0  -9.0   9.0      -9.0
 20      0.101    0.217  0.326    0.217     0.041           1.57   0.13    -9.0  -9.0   8.7      -9.0
 20      0.101    0.217  0.326    0.217     0.041           1.57   0.13    -9.0  -9.0   8.7      -9.0
 -1      0.000    0.000  0.000    0.000     0.000           0.00   0.00     0.0   0.0   0.0       0.0
```

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Appendix B
EXAMPLE OF ERROR/ WARNING MESSAGE REPORT FILE

Example of Error/Warning Message Report File

Calculating Soil Water Content Values. . .
Calculating WR. . .
*** WARNING - no root quantity information for layer, estimating WR
*** WARNING - no root quantity information for layer, estimating WR
*** WARNING - no root quantity information for layer, estimating WR
*** WARNING - no root quantity information for layer, estimating WR
Calculating SALB. . .
*** WARNING - unable to get Temp. Regime from soil class.
*** WARNING - using ave. ambient temperature to determine temperature regime.
Calculating U. . .
Calculating SWCON. . .
Calculating SWCON2. . .
Calculating CN2. . .
*** ERROR - unable to get SubGroup from soil class., No Soil Group selected.
*** WARNING - unable to determine CN2, using default = 88

Table of Contents
MDS DATA
SUMMARY REPORTS & GRAPHICS

Chapter 1
INTRODUCTION

SUMMARY REPORTS PROGRAM DESCRIPTION

The Summary Reports program generates summary reports from the Minimum Data Set (MDS) entered into DSSAT. The program produces the following reports which can then be printed.

Chronology report
A chronology listing of experiment events including experimental operation, phenological stages, and unusual events affecting crop growth.

Total Substance Input by Plots
A report on the total amount of substance inputs (N,P,K, $CaCO_3$) by plots. The report is based on the information contained in MDS Forms N and O.

Summary of Preplant Soil Water and Fertility
A report of preplant soil fertility and preplant soil water data by treatment and layers. The report is based on the information contained in MDS Forms I-1 and J-1.

Weather Data Summary
A report showing tables of the average minimum and maximum temperatures, solar radiation, precipitation, and degree days. Two formats are available:
Continuous Summary Report. Weather data is reported monthly using the entire file.
Periodic Summary Report. Weather data is summarized in 10-day periods bounded by user-inputted dates.

WEATHER GRAPHICS PROGRAM DESCRIPTION

The Weather Graphics program creates a graph of the weather data versus time. The weather data are those entered in Form C of the MDS (see *DSSAT User's Guide–Weather Data Entry*). The variables that can be graphed are maximum temperature, minimum temperature, precipitation, solar radiation, and degree days. For precipitation, solar radiation, and degree days, the individual data points or their accumulative value can be graphed. An available option is to superimpose a bar plot of the growth stages from an experiment data set onto the graph.

NOTE: *Please read the Appendix in this User's Guide before using the Weather Graphics program.*

Chapter 2
START MDS
SUMMARY REPORTS & GRAPHICS

EXECUTE MDS SUMMARY REPORTS & GRAPHICS PROGRAMS

Hard-disk Users

To access the MDS Summary Reports & Graphics programs from the DSSAT shell, select "S Summary" from the DBMS menu and open the Summary main menu. Select either:

"S MDS Summary Reports" to execute the Summary Reports program, or

"G Weather Graphics" to execute the Weather Graphics program.

Floppy-disk Users

The procedures to access the MDS Summary Reports & Graphics programs are as follows.

To execute the Summary Reports program, do the following.

> Insert the "MDS Summary Reports & Graphics" disk in drive A. At the DOS prompt A>, type DBREPORT and then press the <ENTER> key.

To execute the Weather Graphics program, do the following.

> Insert the "MDS Summary Reports & Graphics" disk in drive A. At the DOS prompt A>, type WEAGRAPH and then press the <ENTER> key.

While the program is processing, DO NOT remove the program disk from the drive, unless instructed.

NOTE: All areas where users must enter a response are highlighted on the screen. Press the <ENTER> key to complete an entry.

CHAPTER 3
PRODUCE SUMMARY REPORTS

This chapter explains how to produce both experiment and weather data summary reports.

MDS SUMMARY REPORTS **Version 2.1**

Summary Report Main Menu

1) Chronological Listing of Events in an Experiment
2) Total Substance Input by Plots
3) Summary of Preplant Soil Fertility and Water Content
4) Weather Data Summary Report

Select a menu item by number:

All reports output to your printer. If you do not have a printer attached to your computer, press <ESC> to quit.

MAIN MENU FOR SUMMARY REPORTS

When you execute the Summary Reports program, the Summary Reports main menu screen will be presented. Options 1, 2, and 3 require the selection of an experiment data set. Option 4 requires the selection of a weather data set.

OPTIONS 1, 2, AND 3

After selecting Option 1, 2, or 3, you will need to identify the data set to be used to produce the report. The following screen allows selection of an experiment data set.

MDS SUMMARY REPORTS **Version 2.1**

Exp Master List

MAIZE IB WA 83 1

PgUp/PgDn-Scrolls Window

Currently Selected MDS

Drv & Path ....>	C:\MAIZE\IB\WA\83\01
Exp. ID..........>	IB WA 83 1
Institute ....>	International Benchmark Sites
>	Network for Agrotechnology Transfer
Country ....>	U.S.A.
Experiment .. >	Maize cultivar by applied nitrogen
description ....>	Fertility experiment Cultivars are
>	Pioneer X304C and H610

Messages

<F1>	=	Help.
<F2>	=	Select Experiment by entering the drive and path of the data.
<ESC>	=	Return to previous menu.

This screen has three main windows. In the left window, "Exp Master List" shows all the experiment data sets available in DSSAT. The top right window displays information on an experiment data set highlighted in the "Exp Master List." The bottom right window shows the key options available while in this screen.

EXPERIMENT SELECTION Select a data set from the "Exp Master List" or enter the drive and path where the existing data set is located.

Hard-disk Users

To select an experiment from the "Exp Master List," do the following.

> Highlight the desired experiment by using the cursor movement keys and press the <ENTER> key. If no experiment filenames are in the DSSAT master list, the message [NO ITEMS IN LIST] will be displayed.

To select an experiment by entering the drive and path, do the following.

Press the <F2> key. Enter the drive and pathname where an existing experiment resides.

DRIVE: The letter representing the drive where the experiment data are located (e.g.,'A').

PATHNAME: The pathname of the subdirectory where the weather data are located. If you are not using subdirectories, then enter '\' for the root directory (e.g., '\' refers to the root directory; '\DATA' refers to the subdirectory DATA). If you are not sure what a pathname is, refer to your DOS manual.

Floppy-disk Users

To select an experiment, do the following.

1. Insert the EXPERIMENT DATA disk into an available drive. Press the <F2> key.

2. Enter the drive and pathname where the data set is located (see 'Drive' and 'Pathname' in the "Hard-disk Users" section above).

NOTE: The "Exp Master List" shown in the left window of the example screen will display the message [NO ITEMS IN LIST].

ACCESSING DATA

Print Summary Report

After selecting the experiment data set, the program will access the data and produce the report. The report will not appear on screen, but when it is ready for printing, the following dialog box will be presented.

When the printer is ready, press any key to continue. <ESC> to quit.

Make sure your printer is turned on before pressing a key.

When printing of the report is complete, press any key to return to the Summary Reports main menu.

OPTION 4 Selecting Option 4 from the Summary Reports main menu gives you the choice of producing a weather summary report in monthly or 10-day intervals.

Select type of report:

1. Monthly Periodic Summary of Weather Data

2. 10-day Periodic Summary of Specific Dates

Choice:

<ESC> to quit

After entering your selection for the type of weather summary report in the above dialog window, you will need to identify the weather data set to be used.

MDS - SUMMARY REPORT **Version 2.1**

Wea Master List		Currently Selected MDS	
CH	TD	Drv & Path ....>	C:\WEATHER\IBWA
DN	CR	Wea. ID..........>	IB WA Period.> 04/03/87 to 09/10/87
FN	ET	Institute ....>	International Benchmark Sites
IB	**WA**	>	Network for Agrotechnology Transfer
		Country ....>	U.S.A.
		Station name >	

Messages

<ENTER>	=	Continue with currently selected MDS.
<F1>	=	Help.
<F2>	=	Select Weather Data by entering the drive, path, and ID codes.
<ESC>	=	Return to previous menu.

PgUp/PgDn-Scrolls Window

This screen has three main windows. In the left window, "Wea Master List" shows all the weather data sets available in DSSAT. The top right window displays information on a weather data set highlighted in the "Wea Master List." The bottom right window shows the key options available while in this screen.

WEATHER DATA SELECTION

Select a data set from the "Wea Master List" or enter the drive and path where the existing data set is located.

Hard-disk Users

To select a data set from the "Exp Master List," do the following.

> Highlight the desired data set by using the cursor movement keys and press the <ENTER> key. If no weather data set filenames are in the DSSAT master list, the message [NO ITEMS IN LIST] will be displayed.

To select a data set by entering the drive and path, do the following.

Press the <F2> key. Enter the drive and pathname where an existing data set resides.

DRIVE: Enter the letter representing the drive where the weather data are located (e.g., 'A').

PATHNAME: Enter the pathname of the subdirectory where the weather data are located. If you are not using subdirectories, then enter '\' for the root directory (e.g., '\' refers to the root directory; '\DATA' refers to the subdirectory DATA). If you are not sure what a pathname is, refer to your DOS manual.

Floppy-disk Users

To select a data set, do the following.

1. Insert the WEATHER DATA disk into an available drive. Press the <F2> key.

2. Enter the drive and pathname where the data set is located (see 'Drive' and 'Pathname' in the "Hard-disk Users" section above).

NOTE: The "Wea Master List" shown in the left window of the example screen will display the message [NO ITEMS IN LIST].

PERIODIC SUMMARY REPORT

For the 10-day periodic summary report, you must enter the period of the report. It is suggested that you input the planting and harvest dates, but you may input any dates included in the weather data base. The default dates will be the beginning and ending dates found in the data base for the selected weather data set.

```
Enter the period of the report:
From Beginning Date  01/01/84  to Ending Date  01/01/87
```

After entering the dates be sure your printer is turned on, and then press any key to continue.

When printing of the report is complete, press any key to return to the Summary Reports main menu.

CHAPTER 4
PRODUCE WEATHER GRAPHS

This chapter describes the procedures for producing weather graphs of the "Required" weather data found in MDS Form C.

The Weather Graphics program produces plots of weather data variables versus time (in days). It also offers the option of placing the crop growth stage data from a specified experiment data set on the weather data graphs in the form of vertical lines.

NOTE: You must have weather data in MDS format to use this program. Use the Utilities program (see Chapter 4, DSSAT User's Guide–Utilities) *to convert weather data to MDS format.*

RETRIEVE DATA FOR GRAPHICS

When you execute the Weather Graphics program, the following dialog box will appear.

Would you like to include growth stage data in the graph? (Y/N)

If 'Y' is chosen, select an experiment data set. Follow the example screen and the instructions found in Chapter 3 of this User's Guide, in the section entitled, "Experiment Selection."

If 'N' is selected, or after selecting the experiment data set, select a weather data set to graph.

Enter the period to be retrieved for the graphic program.
The weather data set ranges from 17/05/84 to 30/07/85.

Beginning Date (dd/mm/yy): **17/05/84**

Ending Date (dd/mm/yy): **30/07/85**

Specify the time period to be graphed. This period must fall within the time range (listed on the screen) available in the weather data set and is limited to a maximum of two years.

WEATHER GRAPHICS **Version 2.1**

WEATHER DATA	MINIMUM DATA SET
InstID: IB StatID: WA	InstID: IB SiteID: WA ExpNo: 01
Dates: 18/05/1983 to 30/07/1984	Exp Yr: 83 Crop: MZ
No. of Days: 440	No. of Growth Stages: 4

D Select Graphic Driver
S Specify Type of Graph
G Graph Weather Data
Q Quit

MAIN MENU FOR WEATHER GRAPHICS

Use the cursor keys or select a letter to highlight an option from the Weather Graphics main menu. Press the <ENTER> key to enter your selection.

WEATHER DATA

InstID: IB StatID: WA
Dates: 18/05/1983 to 30/07/1984
No. of Days: 440

MINIMUM DATA SET

InstID: IB SiteID: WA ExpNo: 01
Exp Yr: 83 Crop: MZ
No. of Growth Stages: 4

Select a new graphic driver from the menu below.

Detect
CGA
MCGA
EGA
EGA64
EGAMono
HercMono
ATT400
VGA

D SELECT GRAPHICS DRIVER

The program will select the proper graphic driver for your machine. If for any reason you wish to select a different driver, select option "D Select Graphic Driver" from the Weather Graphics main menu and choose the proper driver for your system.

The graphic driver menu choices are defined as follows.
Detect. Requests the weather graphics program to automatically detect and select the proper mode for your system.
CGA. Selects the graphic driver compatible with the IBM Computer Graphic Adapter (CGA) standard.
MCGA. Selects the graphic driver compatible with the Monochrome Computer Graphics Adapter (MCGA).
EGA. Selects the graphic driver compatible with the IBM Enhanced Graphic Adapter (EGA) standard with more than 64K video RAM.
EGA64. Selects the graphic driver compatible with the EGA standard with 64K or less video RAM.
EGAMono. Selects the graphic driver compatible with the EGA standard for monochrome monitors.

HERCMono. Selects the graphic driver compatible with the Hercules Display adapter.
ATT400. Selects the graphic driver compatible with the AT&T 400 series computers.
VGA. Selects the graphic driver compatible with IBM VGA standard.

WEATHER GRAPHICS **Version 2.1**

WEATHER DATA	MINIMUM DATA SET
InstID: IB StatID: WA	InstID: IB SiteID: WA ExpNo: 01
Dates: 18/05/1983 to 30/07/1984	Exp Yr: 83 Crop: MZ
No. of Days: 440	No. of Growth Stages: 4

Describe the type of graph to produce:

	VARIABLE	TYPE OF GRAPH	LINE STYLE
Line 1	Min. Temp. Deg C.	STOP	Solid Line
Line 2	Max. Temp. Deg C.	Min. Temp. Deg C	Dotted Line
Line 3	Precip. mm/day	Max. Temp. Deg C	CenterLine
Line 4	NOT DEFINED	Solar Rad. MJ/m^2	Dashed Line
Line 5	NOT DEFINED	**Precip. mm/day**	
		Degree Days	

S SPECIFY TYPE OF GRAPH

Select option "S Specify Type of Graph" from the Weather Graphics main menu to specify the data and type of graph to produce. The Weather Graphics program allows up to five data items to be included in a graph. For each data item, you must identify the variable, type of graph, and line style. The system will prompt you for these inputs.

After choosing a variable from the pop-up "Variable" menu, select the type of graph and line style from the menus presented. Select 'STOP' from the "Variable" menu when selections are completed.

G GRAPH WEATHER DATA

Select option "G Graph Weather Data" from the Weather Graphics main menu to view the graph. When the graph appears on the screen, press <PrtSc> to print the graph (see Appendix) or any key to return to the Weather Graphics main menu.

Table 1 lists the growth stages, by crop, that will be shown on the graph a vertical lines if you chose to have the growth stage data included in the graph.

Table 1. Crop-specific growth stages used in the weather graphs.

CROP	STAGES TO INCLUDE IN GRAPH
MAIZE	VE, V6, R1, R7, (or R6)
SORGHUM, RICE, WHEAT, MILLET	10, 13, 15, 65, 92 (or 93-99)
SOYBEAN, BEAN	V0, V4, R4, R6, R8 (or R7)
PEANUT	VE, V4, R1, R3, R5, R8 (or R7 or R9)
AROID	V0, V3, R1, V8, V11, V25, S, R7
CASSAVA	VE, V1, V2, R1, R7

QUIT

Select option "Q Quit" to exit the Graphics program.

Appendix
PRINT WEATHER GRAPHS

To print a graph using any IBM-compatible printer, you must install the graphic (screen print) program in your IBM before using the Weather Graphics program. The screen print program for the MS-DOS system is titled GRAPHICS.COM on the system disk. Refer to your MS-DOS manual for installation procedures.

Once the screen print program is loaded, follow the instructions found in Chapter 4, in the section entitled "G Graph Weather Data" until the graph is displayed. Press the <PrtSc> key (on some keyboards, you must press the <SHIFT> key at the same time) to print the graph.

Table of Contents
UTILITIES

CHAPTER 1
INTRODUCTION

PROGRAM DESCRIPTION

The Utilities program allows the user to:

1. Rebuild Index Files of an experiment data set
2. Convert ASCII weather data to MDS format
3. Upgrade experiment data set to version 2.1 format
4. Modify IDs of an experiment data set
5. Modify IDs of a weather data set
6. Import harvest data from ASCII into Form R-2
7. Maintain Minimum Data Set Master List.

Rebuild Index Files of Experiment Data Set

This utility rebuilds corrupted or damaged index files of an experiment data set (Forms A-S, except C). For damaged index files of a weather data set (Form C), see *DSSAT User's Guide–Weather Data Entry*.

An experiment data set stored in DSSAT is a collection of data-base and index files. Each index file is used to arrange data within a data-base file according to the file's index key. Whenever a data-base file is updated, its related index file will be rearranged automatically. For example, if a data-base file is indexed with a numerical date as the index key, all items in the data-base file will be arranged in chronological order. However, if there are any unusual events, such as power failure or system error while a data-base file is being updated, the related index files may be damaged. When this happens, this Utility program can be used to rebuild the index files.

You may also need to use this utility if one of the following events happens while running the Experiment Data Entry program (see *DSSAT User's Guide–Experiment Data Entry*).

1. A system error indicating an "Index error read."
2. The data displayed on the screen are not the same as those input.
3. Duplicate data were displayed when only one set was input.
4. An "Invalid code" error is displayed when the code input is correct.

If other similar events occur while running the Experiment Data Entry program, this utility should be run. If, however, the event continues to occur after using this utility, exit the program and report the problem to IBSNAT.

Convert ASCII Weather Data to MDS Format

This utility converts required weather data (daily maximum and minimum temperature, solar radiation, and precipitation) from an ASCII file to Form C-1 data-base files. When data are converted, you can use the Weather Data Entry program (see *DSSAT User's Guide–Weather Data Entry*) to access the weather data in the data-base files.

The program locates the required weather data items, wherever they are located in the ASCII file, by prompting you for their locations. That is, for any of the required data items, you will need to enter the item's starting and ending column numbers and the number of decimal places. The program also requires you to enter the unit of measurement of each required weather data item. These measurement units are delimited for each item (see list below) and you must choose from amongst those allowed.

Date: Julian or calendar.
Maximum and minimum temperature: Celsius or Farenheit.
Solar radiation: $MJ/m^2/day$; $cal/cm^2/day$; or $KW/m^2/day$.
Precipitation: mm ; in.; cm.

If your ASCII file is stored in IBSNAT-specified format (see IBSNAT TR5–File Format Description for FILE1), you do not need to provide the above information. The program will automatically convert the data to MDS data-base files.

NOTES: 1. Because of disk space limitations, this utility can process only two years of weather data at one time. If you have weather data for more than two years in an ASCII file, you will need to reallocate the data so there are only two years of data per file. For example, if there are three years of weather data in an ASCII file called "W.DAT," then you will need to create a second file to store one of the three years of data. The first file will then contain the first two year's weather data and the second file, the third year's data.

2. The length of each record in the ASCII file cannot exceed 254 characters.

Upgrade Experiment Data Set to Version 2.1 Format

Some of the Minimum Data Set (MDS) forms were changed in the DSSAT, v 2.1. Thus, experiment data sets (Form A-S, except C) that were input with the Experiment Data Entry program, version 1.0, are not compatible with the current DSSAT system. This utility upgrades experiment data sets version 1.0 to version 2.1 format.

If you have weather data sets (Form C) inputted with version 1.0 of the Data Entry program, you can use the Weather Data Entry program (see *DSSAT User's Guide–Weather Data Entry*) to upgrade to version 2.1.

NOTE: We recommend that a copy be made of the experiment data set before using this utility. In case of error, you can use the copy as a backup for the data set.

Modify IDs of an Experiment Data Set
This utility modifies the Institute ID, Site ID, experiment number, year of experiment, and crop code of an MDS. Since these IDs are used to identify an experiment data set, change them with caution. This utility should only be used when:

1. Incorrect IDs were accidentally input while using the Experiment Data Entry program, or

2. An Institute ID is assigned to replace the temporary code '99'.

NOTE: We recommend that a copy be made of the data set before using this utility. In case of error, you can used the copy as a backup for the data set.

Modify IDs of a Weather Data Set
This utility modifies the Institute ID and Weather Station ID of a weather data set. Since these IDs are used to identify the weather data set, change them with caution. This utility should only be used when:

1. Incorrect IDs were accidentally input while using the Weather Data Entry program, or

2. An Institute ID is assigned to replace the temporary code '99'.

NOTE: We recommend that a copy be made of the data set before using this utility. In case of error, you can use the copy as a backup for the data set.

Import Harvest Data From ASCII Into Form R-2 (File Formats)
This utility imports crop data stored in an ASCII file into Form R-2 of the Minimum Data Set (see *DSSAT User's Guide–Experiment Data Entry*). If you have crop data available in computer form, use this function to import the data into Form R-2, even if the ordering of the data is somewhat different

from that of Form R-2. However, to ensure correct input into the IBSNAT data base, make sure your ASCII file format conforms to the following guidelines.

1. Begin a comment line with an asterisk. Comments can appear anywhere in the file (see example in Chapter 8), but comments will not be retrieved to the data-base file.

2. Each group of data must have column heads which identify them (see example).

   a. Four of the column heads—date, plot, vstage, rstage—must be in this order.

   b. The other column heads, code = 1, code = 2, code = 3, etc., used to designate the harvest codes found in Form R-2, may be in any order. (Definitions for crop-specific harvest codes may be found in the HELP screen of Form R-2 in the Experiment Data Entry program and in IBSNAT TR1, 3rd ed. in the Form R-2 section.)

   c. You must define at least one crop harvest code column head (e.g., code = 1) datum.

3. Each data item must be separated by 1 or more spaces (see example).

4. Dates must be in international format (i.e. dd/mm/yy).

5. Data for date, plot, and vstage and/or rstage must be present on each data line. However, if there are missing crop data, then a "#" must be used to indicate the missing data (see example).

NOTE: The length of each line cannot exceed 80 characters.

Maintain Minimum Data Set Master List

This utility is designed for hard-disk users only to maintain the Experiment and Weather Data Master Lists.

Within the DSSAT DBMS, a master file exists that contains the description and location of your MDS. The file C:\DSSAT\MDSINFO.DBF keeps track of your experiment data while the file C:\DSSAT\WEAINFO.DBF keeps track of your weather data. This utility allows you to create and edit these master files, and can generate a descriptive report of your data files.

Chapter 2
START THE UTILITIES PROGRAM

EXECUTE DBMS UTILITIES PROGRAM

Hard-disk Users

To access the Utilities program from the DSSAT Shell, select option "U Utilities" from the DBMS main menu and open the Utility menu.

Floppy-disk Users

To access the Utilities program, insert the "DBMS Utilities" disk in drive A. At the DOS prompt A>, type UTIL and then press the <ENTER> key.

While the program is processing, DO NOT remove the program disk from the drive unless instructed.

NOTE: All areas where users must enter a response are highlighted on the screen. Press the <ENTER> key to complete an entry.

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Utility Main Menu

I	-	Rebuild Index Files of Experiment Data Sets
C	-	Convert ASCII Weather Data to MDS Format
V	-	Upgrade Experiment Minimum Data Set to Version 2.1 Format
M	-	Modify IDs of an Experiment Data Set
W	-	Modify IDs of a Weather Data Set
H	-	Import Harvest Data from ASCII into Form R-2
U	-	Maintain Minimum Data Set Master List

<ESC> to quit

MAIN MENU FOR UTILITIES PROGRAM

The Utilities program main menu presents seven program options. Move the highlight bar using the cursor movement keys until the desired utility program is highlighted and then press the <ENTER> key. You may also select a program by pressing the letter associated with the desired program. For example, to select "Upgrade Experiment Data Set to Version 2.1 Format," press the letter 'V'.

CHAPTER 3
REBUILD INDEX FILES OF EXPERIMENT DATA SETS

When the option "1 Rebuild Index Files of Experiment Data Set" is selected from the Utilities main menu, the following screens are presented.

```
INDEX EXPERIMENT DATA FILES                                  Version 2.1

== Exp Master List ==       ========== Currently Selected MDS ==========

 MAIZE   IB WA 83 1       Drv & Path ....>  D:\MAIZE\IB\WA\83\01\
                          Exp. ID........ >  IB WA 83 1
                          Institute ........>  International Benchmark Sites
                                          >  Network for Agrotechnology Transfer

                          Country .........>  U.S.A.

                          Experiment ...>  Maize cultivar by applied nitrogen
                          description ....>  fertility experiment cultivars
                                          >  Pioneer X304C and H610

                          ============== Messages ==============
                            <ENTER> =  Continue with above Weather Data.
                               <F2> =  Select Weather Data by entering the
                                       drive and path of the data.
PgUp/PgDn-Scrolls Window     <ESC> =  Return to previous menu.
```

EXPERIMENT SELECTION This screen has three main windows In the left window, "Exp Master List" shows all the experiment data sets available in DSSAT. The top right window displays information on an experiment data set highlighted in the "Exp Master List." The bottom right window shows the key options available while in this screen.

Select a data set from the "Exp Master List" or enter the drive and path where the existing data is located.

Hard-disk Users

To select an experiment from the "Exp Master List," do the following.

Highlight the desired experiment by using the cursor movement keys and press the <ENTER> key. If no experiment filenames are in the DSSAT master list, the message [NO ITEMS IN LIST] will b displayed.

To select an experiment by entering the drive and path, do the following.

Press the <F2> key. Enter the drive and pathname where an existing experiment resides.

DRIVE: Enter the letter representing the drive where the weather data are located (e.g., 'A').

PATHNAME: Enter the pathname of the subdirectory where the weather data are located. If you are not using subdirectories, then enter '\' for the root directory (e.g., '\' refers to the root directory; '\DATA' refers to the subdirectory DATA). If you are not sure what a pathname is, refer to your DOS manual.

Floppy-disk Users

To select a data set, do the following.

1. Insert the EXPERIMENT DATA disk into an available drive. Press the <F2> key.

2. Enter the drive and pathname where the data set is located (see 'Drive' and 'Pathname' in the "Hard-disk Users" section above).

NOTE: The "Exp Master List" shown in the left window of the example screen will display the message [NO ITEMS IN LIST].

INDEX EXPERIMENT DATA FILES **Version 2.1**

*** PLEASE DO NOT INTERRUPT ***

*** FILE INDEXING IN PROGRESS ***

Indexing FORM A. . .

CAUTION: When the data set is found in the given drive and subdirectory, the above screen will be displayed. DO NOT TURN OFF or DISTURB THE COMPUTER WHILE THIS INDEXING IS IN PROGRESS. This may damage the data-base and index files causing any or all of the data to be lost or damaged.

Chapter 4
CONVERT ASCII WEATHER DATA TO MDS FORMAT

When the option "C Convert ASCII Weather Data to MDS Format" is selected from the Utilities main menu, the following screens are presented.

There is no fixed format for the ASCII weather data; however, if the ASCII files are not in IBSNAT-specified form, you need to have the following information ready for each required weather data item before running this utility.

1. Starting and ending column.
2. Decimal place.
3. Units used.

SAMPLE ASCII WEATHER DATA FILE

Following is an example of an ASCII Weather Data file. Data in this example will be used in the following sample screens.

```
116718111332267143417922473191921661961303400091307100842000470030103601341
116718211322071150917162287192420991968216000191205765823000650020103602339
116718311322238158618472458180321071975312400192106350769000720017103603411
116718411312331150518132366186121111976223300090106916805001050017103602940
116718511302326145518302262187920781979175500091907650863000850018103602199
116718611302386148018812448194221841979207900092507550851000680017103601815
116718711302336123617852557189222031982285500092306816820000970015103602492
116718811292137126817502233192420941990109400091107410861001040016103601899
116718911292427162420002458221823551993060200092107630862000730018699901857
116719011292499150119312484194722151991175200092007920892000780018699901638
116719111282594162920292643205723351997242500091906895844000940018699901983
116719211272478135918772610199222892010260800092107200838001020017699902302
116719311272484134218602478197822592024187500092107350870001090017699901586
116719411252123150918332297207622062034098000792108500900000680037699901222
116719511242326141318382316190621222037144400091808160883000630031699901511
```

Format of Sample ASCII file

Data Item	Column	Dec. Place	Unit Used
Year	4		
Julian date	5 - 7		
Maximum temperature	12 - 15	2	Celsius
Minimum temperature	16 - 19	2	Celsius
Solar radiation	40 - 43	2	MJ/m^2
Precipitation	44 - 46	0	millimeter

CONVERT ASCII WEATHER DATA TO MDS FORMAT **Version 2.1**

This utility program converts required weather data from ASCII files to MDS data base files. The IBSNAT required weather data are date, max. and min. air temperature, solar radiation, and precipitation.

For a weather ASCII file that is not in IBSNAT-specifed format (see format description for FILE1 in IBSNAT TR5), have the following information for each required weather data item ready before you continue.

- starting and ending column
- decimal place
- the unit that is used

NOTE:
1. Because of the limitation of disk space in a disk, this program can process a max. of two years weather data at a time. If you have more than two years weather data in a single file, it will have to be separated into files with two years of data in ASCII file.
2. The maximum record length is 254 (i.e., ending column no. can't exceed 254).
3. Date must be in Julian, or mm/dd/yy, or dd/mm/yy format. Year can be expressed in 2 or 4 digits.

Press any key to continue or (ESC) to quit . . .

INTRO-DUCTION SCREEN

When "C Convert ASCII Weather Data to MDS Format" is selected from the Utilities main menu, the above screen will be displayed.

CONVERT ASCII WEATHER DATA TO MDS FORMAT **Version 2.1**

Please identify the weather data by entering the following information.
(Press <F1> if you need any help)

Institute ID: **IB**

Station ID: **OL**

<ESC> to quit

IDENTIFY WEATHER IDS

Type in the Institute ID and Weather Station ID that correspond to the weather data set you are going to convert.

<F1> - Displays Institute ID HELP for this screen
<ESC> - Exits this program and returns to Utilities main menu

CONVERT ASCII WEATHER DATA TO MDS FORMAT : **Version 2.1**

Please insert disk that contains the ASCII file into an available disk drive.

Press any key when ready or <ESC> to quit.

Enter information for ASCII file:

- drive name (specify path if necessary): **C: \WEATHER**
- file name (specify file extension if necessary): **OL87.DAT**

Is the ASCII file in IBSNAT specified format (Y/N)? **N**

<F1> for Help

ENTER ASCII FILE INFORMATION

1. If the ASCII file is stored on a disk, place the disk in an available disk drive; otherwise, start at step 2.

2. Enter the drive, subdirectory, and name of the ASCII file to be converted.

3. The program will search for the specified file in the given disk drive and directory. If the file is not found, a "FILE DOES NOT EXIST ! ! !" message will be displayed, and you will need to check that your drive and/or path are correctly entered.

4. If the ASCII file is stored in IBSNAT specified format, enter 'Y'; otherwise, enter 'N'.

   a. If 'Y' is entered, a message "Processing . . . " will be displayed on screen. When the conversion is completed, press any key to continue (see "Converted Data" in this chapter).

   b. If 'N' is entered, the following screen will be displayed.

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CONVERT ASCII WEATHER DATA TO MDS FORMAT **Version 2.1**

Item	Beg. Col.	End. Col.	Dec.	Unit
Date	5	7		Julian
Max. air temperature	12	15	2	deg. Celsius
Min. air temperature	16	19	2	deg. Celsius
Solar radiation	40	43	2	MJ/m^2
Precipitation	44	46	0	millimeter

NOTE: For missing data items (except date), enter "-9" for beg. & end. col. If you make any mistake while definning the format, you will have a chance to correct it after all items have been defined.

Is above input correct? (Y/N or <ESC> to quit)

DEFINE WEATHER DATA FORMATS

If your ASCII data file is not in IBSNAT-specified format, you will be prompted for the following information for each data item. Using the data given in the example, at the beginning of this chapter, the information shown on the above sample screen was entered at the appropriate prompt.

1. If the date of the ASCII file is in Julian date, then, when specifying the beginning and ending column numbers, DO NOT include those columns that contain the year. After you enter the beginning and ending column numbers of the Julian date, you will be prompted to enter the columns that contain the year (this prompt is shown below).

Enter beginning column of the year: 4 ending column: 4

Be sure the ending column number for each data item is less than 254.

2. After entering all of the information and at the prompt, type 'Y' if the data are correct.

If any data items are not correct, type 'N' and you will be able to re-enter information. To ABORT this program and return to the Utilities main menu, press the <ESC> key.

3. Type 'Y' at the decimal-point prompt if any numbers found in the ASCII file have decimal points stored within them.

The program will then read the ASCII file information and store it in the data base for Form C-1. A message "Processing. . ." is displayed on the screen.

When the conversion is completed, press any key to continue.

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DATE mm/dd/yy	TMIN C	TMAX C	PRECIP mm	SOL. RAD MJ/^2	DATE mm/dd/yy	TMIN C	TMAX C	PRECIP mm	SOL.RAD MJ/m^2
06/30/87	14.3	22.7	0	30.34	07/01/87	15.1	20.7	1	21.60
07/02/87	15.9	22.4	1	31.24	07/03/87	15.1	23.3	0	22.33
07/04/87	14.6	23.3	0	17.55	07/05/87	14.8	23.9	0	20.79
07/06/87	12.4	23.4	0	28.55	07/07/87	12.7	21.4	0	10.94
07/08/87	16.2	24.3	0	6.02	07/09/87	15.0	25.0	0	17.52
07/10/87	16.3	25.9	0	24.25	07/11/87	13.6	24.8	0	26.08
07/[illegible]/87	13.4	24.8	0	18.75	07/13/87	15.1	21.2	7	9.80
07/14/87	14.1	23.3	0	14.44					

Are the above converted data correct? (Y/N)

CONVERTED DATA

The converted data are displayed in the manner shown in the sample screen above. Pressing the <ESC> key at any time during the data display listing will stop the visual display, although the conversion process will continue.

Save Converted Data

When conversion is complete, view the data. If the data are NOT correct, type 'N' at the "correct?" prompt. The converted data will not be saved. Instead, you will be prompted to press any key and the screen in the section entitled "Identify Weather IDs" in this chapter will be presented. You may then designate another weather data set for conversion or quit the Utilities program.

Type 'Y' at the "correct?" prompt if the converted data are correct. The following screen will be displayed.

The converted data will be saved to MDS files and named according to the IBSNAT file-naming convention. This means that the first 4 letters of the name will be the Weather ID code which identifies the weather data site.

Enter the drive and path: C:\ws\

Press any key to continue, <ESC> to quit. . .

HARD-disk USERS

If you have files saved containing weather data for the same weather data site, enter the drive and path of the directory where the filenames of these files reside. The program will append the converted data file to the existing data-base files.

If you:

1) have entered the wrong drive and path, or

2) do not have weather data files already saved for this site, the following message will be displayed.

File c:\ws\IUAM......does not exist in the directory specified.
Do you want to change the drive and path? (Y/N)

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Type 'Y' to enter another drive and path.

If you type 'N', the program will create MDS Weather Data files in the driv previously specified. Go to the section, "Created New MDS Weather Files,' which follows.

Floppy-disk Users

If you have saved files containing weather data for the same weather data site, and IF ENOUGH DISK SPACE EXISTS ON THAT DISK, insert the disk into the drive and enter the drive and path of the directory where the filenames of these files reside. The program will append the converted dat file to the existing data-base files.

If you enter a drive and path to a disk without enough disk space, the data will not be saved, the Utilities program will be exited, and the DSSAT main menu screen will appear.

If you:

1) have entered the wrong drive and path, or

2) do not have weather data files already saved for this site, the following message will be displayed.

```
File a:\wa\IUAM......does not exist in the directory specified.
Do you want to change the drive and path? (Y/N)
```

Type 'Y' to enter another drive and path.

If you type 'N', the program will create MDS weather files in the drive and path specified. Go to the section, "Create New MDS Weather Data Files," which follows.

Create New MDS Weather Files

To create new MDS weather files containing the converted weather data, enter the following information.

Enter information concerning weather data IB WA:

Station Name: **WAIPIO WEATHER STATION**

Latitute:	deg.	**21**	min.	**25**	Direction (N, S):	**N**
Longitude:	deg.	**158**	min.	**0**	Direction (E, W):	**W**

After entering the requested information, and when you confirm that the information is correctly entered by typing 'Y' at the "correct?" prompt, the MDS files will be created and saved. The screen in the section entitled "Identify Weather IDs" in this chapter will be presented and you may then designate another weather data set for conversion or quit the Utilities program.

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CHAPTER 5
UPGRADE EXPERIMENT DATA SET TO VERSION 2.1 FORMAT

When the option "V Upgrade Minimum Data Set to Version 2.1 Format" is selected from the Utilities main menu, the same screen as displayed on the first page of Chapter 3 will be presented. Follow the instructions found there in the section entitled "Experiment Selection" and then return to this chapter.

UPGRADE EXPERIMENT DATA SET TO VERSION 2.1 FORMAT Version 2.1

Current ID Year

1. IB WA 1 MZ 83

Update this Minimum Data Set to Version 2.1? (Y/N)

<ESC> to quit

UPGRADE EXPERIMENT DATA SET TO VERSION 2.1

If the experiment data set is found in the specified drive and directory, the program will display its Identification Keys as illustrated in the screen (previous page).

If the data set is NOT found, an error message will be displayed.

To upgrade the experiment data set that was found, enter 'Y' at the prompt to begin the upgrade process. If 'N' is entered, you will be asked to select another experiment data set to upgrade.

When the upgrading process is completed, press any key. You will be returned to the Experiment Selection screen and may either select another experiment to upgrade, or exit to the Utilities main menu.

CAUTION: This program DOES NOT create a NEW Minimum Data Set. It CHANGES the existing data set in the specified drive and directory to the new format. There is no program to convert version 2.1 back to a version 1.0, so if you will need the version 1.0 data set, make a backup copy.

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CHAPTER 6
MODIFY IDs
OF AN EXPERIMENT DATA SET

When the option "M Modify IDs of an Experiment Data Set" is selected from the Utilities main menu, the same screen displayed on the first page of Chapter 3 will be presented. Follow the instructions found there in the section entitled "Experient Selection" and then return to this chapter.

MODIFY ID'S OF AN EXPERIMENT DATA SET **Version 2.1**

	OLD IDs	NEW IDs
Institute ID:	99	IB
Site ID:	WA	WA
Experiment no.:	1	1
Year of experiment	83	83
Crop code:	MZ	MZ

Is the input correct? (Y/N)

<ESC> to quit

CHANGE EXPERIMENT DATA SET IDS

If the experiment data set is found in the specified drive and directory, the program will display the OLD identification keys and prompt for the NEW keys; otherwise, an error message will be displayed.

If you do not wish to change any identification keys, press the <ESC> key.

You will be returned to the Utilities main menu.

To change the IDs of the experiment data set that was found:

1. Enter new IDs under the heading "NEW IDs" and press the <ENTER> key after each entry.

2. Press the <ENTER> key to retain an "OLD ID."

After you have retained or changed the five IDs, the program will begin the modifications.

CAUTION: DO NOT TURN OFF or DISTURB THE COMPUTER WHILE THIS PROGRAM IS IN PROGRESS. This utility must be allowed to run to completion or you may lose some of your data.

After completion of the key modification process, press any key to return to the Utilities main menu.

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Chapter 7
MODIFY IDs OF A WEATHER DATA SET

When the option "W Modify IDs of a Weather Data Set" is selected from the Utilities main menu, the same screen as on the first page of Chapter 3 will be displayed. Follow the instructions found there in the section entitled "Experiment Selection." Note, however, that you will be choosing a WEATHER data set. Return to this chapter.

```
MODIFY ID'S OF A WEATHER DATA SET                         Version 2.1

                                    Old IDs          New IDs
       Institute ID:                  99               IB
       Weather Station ID:            WA               WA

<ESC> to quit
```

MODIFY WEATHER IDS

If the weather data set is found in the specified drive and directory, the program will display the OLD identification keys and prompt for the NEW keys; otherwise, an error message will be displayed.

Follow the procedure described in Chapter 6 in the section entitled "Change Experiment Data Set IDs." Note, however, that for Weather IDs, you need to retain or change only the two IDs shown in the previous screen.

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Chapter 8
IMPORT HARVEST DATA FROM ASCII INTO FORM R-2

When the option "H Import Harvest Data from ASCII into Form R-2" is selected from the Utilities main menu, the following screens will be presented

IMPORT HARVEST ASCII DATA FROM FORM R-2 **Version 2.1**

This Utility reads an ASCII file and adds these records to the existing Form R-2.

Your input ASCII file must conform to the format specified in Chapter 1 of *DSSAT User's Guide–Utilities*.

Enter the name of the ASCII file:

<ESC> to quit

IMPORT ASCII DATA TO FORM R-2 Identify the file by entering its full pathname; if necessary include the drive specification. If the ASCII file is located on a floppy disk, insert this disk before entering the file's name.

EXPERIMENT SELECTION Select an experiment data set by following the instructions found in Chapter 3 in the section entitled "Experiment Selection."

EXAMPLE HARVEST DATA ASCII FILE

The ASCII file shown in this box will be used as the example file imported into Form R-2.

```
* This file contains data collected for maize experiment IBWA8301.
*
* Data collected for this period are above ground biomass (cod = 3),
* seed weight (code = 5), seed number (code = 6)
*
date        plot   vstage   rstage   code = 1   code = 2   code = 3
18/04/84     1       #        R7      844.10     309.30     1558.0
18/04/84     3       #        R7      1510.3     661.50     2113.0
18/04/84     4       #        R7      1590.5     602.90     2658.0
18/04/84     5       #        R7      1238.4     486.50     2108.0
```

NOTE: Definitions for the crop-specific harvest codes (code = 1, code = 2, etc.) may be found in the HELP screen of Form R-2 in the Experiment Data Entry program and in IBSNAT TR1, 3rd ed. in the Form R-2 section.

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SCREEN DISPLAY OF IMPORTED DATA

The program reads the ASCII file and enters the data into Form R-2 as illustrated in the screen below.

```
*   This file contains data collected for maize experiment IBWA8301.
*
*
*   Data collected for this period are above ground biomass (code = 3), seed
*   weight (code = 5), seed number (code = 6)

DATE        PLOT   VSTAGE  RSTAGE  CODE=3CODE=5  CODE=6
18/04/84     1       #       R7     844.10      309.30     1558.0
 Record added.  Date=18/04/84 Plot=1 V_stg= R_stg=R7Code=3Amt=844.10
 Record added.  Date=18/04/84 Plot=1 V_stg= R_stg=R7Code=5Amt=309.30
 Record added.  Date=18/04/84 Plot=1 V_stg= R_stg=R7Code=6Amt=1558.0
18/04/84     3       #       R7     1510.3      661.50     2113.0
 Record added.  Date=18/04/84 Plot=3 V_stg= R_stg=R7Code=3Amt=1510.3
 Record added.  Date=18/04/84 Plot=3 V_stg= R_stg=R7Code=5Amt=661.50
 Record added.  Date=18/04/84 Plot=3 V_stg= R_stg=R7Code=6Amt=2113.0
18/04/84     4       #       R7     1590.5      602.90     2658.0
 Record added.  Date=18/04/84 Plot=4 V_stg= R_stg=R7Code=3Amt=1590.5
 Record added.  Date=18/04/84 Plot=4 V_stg= R_stg=R7Code=5Amt=602.90
 Record added.  Date=18/04/84 Plot=4 V_stg= R_stg=R7Code=6Amt=2658.0
18/04/84     5       #       R7     1238.4      486.5      2108.0
 Record added.  Date=18/04/84 Plot=5 V_stg= R_stg=R7Code=3Amt=1238.4
 Record added.  Date=18/04/84 Plot=5 V_stg= R_stg=R7Code=5Amt=486.50
 Record added.  Date=18/04/84 Plot=5 V_stg= R_stg=R7Code=6Amt=2108.0

END OF DATA. PRESS ANY KEY TO CONTINUE.
```

If the program enters all data items into Form R-2 without giving an error message (see next section), we suggest you return to the Experiment Data Entry program, open Form R–2, and check that all the values from your ASCII file have been correctly entered.

Press any key to return to the Utilities main menu.

IMPORT ERROR CORRECTION

If an error message is displayed for one or more data item, you need to do one of the following:

1. Open the Experiment Data Entry program, select Form R-2 and edit the item(s) in question by entering the correct value(s), or

2. Open the Experiment Data Entry program, select Form R-2 and delete the entire file. Then, correct the erroneous items in your ASCII file. Return to this utility program and run the program again.

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CHAPTER 9
MINIMUM DATA SET (EXPERIMENT AND WEATHER) MASTER LIST UTILITIES

When option "U Minimum Data Set Master List Utilities" is selected from the Utilities main menu, the following screens will be presented.

MINIMUM DAT SET MASTER LIST UTILITIES **Version 2.1**

MASTER LIST MENU

1) Create Experiment and Weather Master List
2) Edit Experiment Data Master List
3) Edit Weather Data Master List
4) Print Listing of MDS in Experiment Master List
5) Print Listing of MDS in Weather Master List

Select an menu item by number:

<ESC> to quit

CREATE A NEW MASTER LIST

Select Option 1 from the Master List menu to create either the experiment, the weather, or both master lists. This option will enable you to search specific drives for MDS and create new master lists based on the data stored in those drives. The following screen will appear.

MINIMUM DATA SET MASTER LIST UTILITIES Version 2.1

This utility allows you to search various disk drives on your computer system to update the information in the Experiment Master List and Weather Master List.

Would you like to update the Experiment Master List? (Y/N) Y

Enter the drives to be searched. C, D

Would you like to update the Weather Master List? (Y/N) Y

Enter the drives to be searched. C, D

Would you like a printed log of the data sets added to the Master Lists? (Y/N) Y

Press any key to start

This sample screen illustrates the selections made by a user wanting to create both the Experiment and Weather Master Lists. In this case, the program wil search, for each list, drives C and D for MDS. When a data set is found, its ID and location are displayed on the screen. If an error is detected, an error message will be displayed; otherwise, a message stating that the MDS is being added to the master list will be displayed.

If you want a printed copy of the messages enter 'Y' at the last prompt. If you answer 'Y', you will need to set up your printer.

After answering all the prompts, press any key to start.

EDIT A MASTER LIST

Select Option 2 or 3 from the Master List menu to add, change, or delete the records in the Experiment or Weather Master Lists. Although the information stored in each list is different, the editing functions for both options are identical. Following are sample editing screens.

2B

MINIMUM DATA SET MASTER LIST UTILITIES **Version 2.1**

EDIT EXPERIMENT DATA BASE LIST

Crop: **MZ**

InstID: **IB** SiteID: **WA** ExpID: **1** YearID: **83**

Drive & Path D : \MAIZE\IB\WA\83\01\

Description: **Maize cultivar by applied nitrogen fertility experiment. Cultivars are Pioneer X304C and H610**

Record 32 or 116

PgUp - Previous Record F2 - Add Record ESC - Return to Previous Menu
PgDn - Next Record F3 - Delete Record

The highlighted items displayed on the upper portion of this screen and the next one can be edited. The functions of the keys listed on these screens are as follows:

<PgUp> - Displays the previous record.
<PgDn> - Displays the next record.
<F2> - Adds a blank record to the data base. You must enter the data for each field.
<F3> - Deletes the currently displayed record.
<ES> - Returns to the previous menu.

CAUTION: Although this utility allows you to easily edit the information in either master list, you must exercise care since the program does not validate the information you change. Be sure all information entered is correct and the drive and path exist.

MINIMUM DATA SET MASTER LIST UTILITIES **Version 2.1**

EDIT WEATHER DATA BASE LIST

Institute ID: **IB** Station ID: **WA**

Station Name: **WAIPIO**

Latitude:	Deg.:	21	Min.:	25	Direction	(N/S):	N
Longitude:	Deg.:	158	Min.:	0	Direction	(E/W):	W

Data Period: **22/11/83** to **30/07/85**

Drive & Path **D** : **\WEATHER\IB\WA**

Record 34 of 58

PgUp - Previous Record F2 - Add Record ESC - Return to Previous Menu
PgDn - Next Record F3 - Delete Record

Changing the information in the master lists will not change any data in the MDS. To keep the master lists current, the best method is to use Option 1 in the Master List menu. This is preferred because your master lists will then always reflect the MDS data stored on the disk and and will not record data entry errors.

PRINT THE CONTENTS OF MDS MASTER LISTS

To print the contents of the Experiment or Weather Master List, select Option 4 or 5, respectively from the Master List menu. These options use the master list to find the location of each data set. A summary list is printed containing the same type of information stored in the master list.

Please note that the information used to produce the report is taken directly from the data set, not the master list. This is to insure that the report reflects the current status of the MDS, rather than the master list.

NOTE: These reports require a printer which can display a line of 200 characters. Before starting the report, set your printer to the appropriate setting.

Table of Contents
WEATHER ESTIMATORS

CHAPTER 1
INTRODUCTION

PROGRAM DESCRIPTION

The DSSAT Weather Estimators program* offers two weather estimators; both of which estimate daily weather data that have similar statistical characteristics as the actual weather at the analysis site. The two estimators, WGEN (developed by Richardson and Wright, 1984) and WMAKER (developed by Keller, 1982; 1987) have been modified and revised by IBSNAT to link them to DSSAT.

NOTE: Because of storage requirements, the Weather Estimators program ***requires*** *a hard disk. A floppy-disk drive system cannot be used.*

Both the WGEN and WMAKER estimate daily weather data from weather coefficients. These coefficients are determined by each program from historical weather data provided by the user. The WGEN requires historic daily records of at least five (5) years. The WMAKER requires either historic daily records (of five years or more) or historic monthly means (computed from at least five years of data), with standard deviation, of specified data measurements. (An example of both a WGEN and a WMAKER coefficient file can be found in Appendix C.)

WGEN

The historic daily weather data required by the WGEN model to determine coefficients can be entered by the user in one of two ways. The user can choose to enter data using the DSSAT Weather Data Entry Program (see *DSSAT User's Guide—Weather Data Entry*) and then convert this data to ASCII format with the Retrieval program found in the DSSAT Weather Data Entry program. Or, the user can enter the data from an ASCII-formatted file that conforms to IBSNAT weather input file specifications (see IBSNAT TR 5, under "Structures for Model Input Data Files," for IBSNAT-specified weather data format). For detailed procedures of these two methods, refer to Appendix A of this User's Guide.

* The Weather Estimators program allows the user to estimate long-term weather data and save this data to a file. The weather estimator selected in the Strategy Evaluation program estimates historical weather data using the weather coefficients previously determined for a site by the Weather Estimators program. Both programs use either default seed values or seed values entered by the user to generate the weather data. If the same seed values are used in the Strategy Evaluation program that were used in the Weather Estimators program for a set of coefficients, the weather data estimated will be exactly the same as those estimated in the Weather Estimators program. It is thus possible for a user to estimate long-term weather data and determine, before using the Strategy Evaluation program, if these data are reliably consistent with known weather patterns for a site.

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WMAKER

WMAKER determines coefficients from historic daily weather data entered by the user in the same way as described in the WGEN section above. With WMAKER, the user can also interactively enter the required coefficients (described below and whose site-specific data values can be found in readily-available publications) for each month of a year. Latitude and longitude of the weather site are also required if this method is used.

1. Potential ET, in mm (daily mean and standard deviation).
2. Average temperature, degree C (daily mean and standard deviation).
3. Rainy days (monthly mean and standard deviation).
4. Rainfall, in mm (monthly mean and standard deviation).

Chapter 2
DETERMINE COEFFICIENTS

This chapter describes, with the use of an example, the WGEN and WMAKER coefficient programs. Because WGEN requires inputs of ASCII-formatted data, you should first read through the WGEN section and follow the instructions step-by-step on a microcomputer only if you have a data file containing ASCII-formated weather data. WMAKER, however, allows entry of coefficients with the keyboard, and it is recommended that you follow the WMAKER instructions step-by-step and enter the sample data given in the WMAKER section.

NOTE: All areas where users must enter a response are highlighted on the screens. Press the <ENTER> key to complete an entry.

It is important that you read the *DSSAT User's Guide–Installation* for setup information before running either the WGEN or WMAKER Weather Coefficient programs.

NOTE: At any time during the execution of this program, press <CTRL-C> to stop and exit the program.

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IBSNAT DECISION SUPPORT SYSTEM FOR AGROTECHNOLOGY TRANSFER

DBMS   Crop Models   **Applications**   Set Up   Quit

W Weather Estimators
S

G WGEN
W WMAKER

D Determine Coefficients
E Estimate Data

Determine coefficients based on past historic data

↑ ↓ → ← moves you thru menu choices
ESC key exits the current menu

DSSAT Shell v2.1

NOTE: Make sure all Weather Estimators programs (see Appendix C), coefficient directories, and coefficient files are located in one (1) directory.

WGEN COEFFICIENT PROGRAM

After opening the Weather Estimators menu and selecting the WGEN weather estimator, the Weather Estimators main menu screen will appear as shown above. Type 'D' to open "D Determine Coefficient" or highlight and press the <ENTER> key.

Before running this program, you must have files on disk containing, at a minimum, five years of site weather data stored in IBSNAT ASCII format (see Appendix A in this User's Guide for instructions on creating these files).

Inputting Weather Data

The following message will appear in the dialog window.

```
WGEN-Coefficient Estimation

Weather Data directory is C:\DSSAT\HISTDATA\
0-continue with current path;  1-specify new path;  2-exit     1
```

If your weather directory is located in a location other than the one specified in the dialog box, enter '1' and enter the drive and path of the directory location.

After entering '0', or '1' and the drive and path, the following dialog box will appear.

```
Weather directory is C:  \DSSAT\HISTDATA\

SN   SITE   YRS
1    ITIM   12

Select sequence number (SN) of weather data [or 0 to exit]     1
```

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Naming the Coefficient file

Coefficient Estimation

The estimated coefficients will be written to a file of your choice. Name of the file [must be 12 characters or less] → ITIM7412.WGP

For future reference, specify a brief (30 characters) description to identify the estimated coefficients.
Description: ICRISAT–INDIA (17.45 N, 78.47 E)

The WGEN program will determine the weather coefficients from your weather data and save them to a file named by you. In the above dialog box, a sample file name is shown. Below, the file-naming convention is explained. It is recommended that you use this file-naming convention.

IT IM 74 12 WGP

- WGP — WGP to indicate WGEN program.
- 12 — Number of years of weather data.
- 74 — Last 2 digits of the first year of data (i.e., '74' for 1974)
- IM — Weather station ID code.
- IT — Institute ID code.

Identifying the file

Enter a description for the file. This description should briefly describe the data source. Both the description and the filename will be written to the file WGENPAR.DIR. The description will be listed as one of the sets of weather coefficients (see Chapter 3) that can be selected by the user to estimate weather data for this site. The sample description shown in the above dialog box is described as follows.

ICRISAT INDIA (17.45N, 78.47W)

- ICRISAT — Experiment site or weather station
- INDIA — Country
- 17.45N — Latitude
- 78.47W — Longitude

End-WGEN Coefficient Program

The Weather Estimators main menu will be displayed when the program has completed determining the coefficients.

You may now run the Weather Estimators program by typing 'E'. For instructions, go to Chapter 3 of this User's Guide.

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IBSNAT DECISION SUPPORT SYSTEM FOR AGROTECHNOLOGY TRANSFER

DBMS   Crop Models   **Applications**   Set Up   Quit

W Weather Estimators
S
G WGEN
W WMAKER

D Determine Coefficients
E Estimate Data

Determines coefficients based on past climatic record

↑ ↓ → ← moves you thru menu choices
ESC key exits the current menu

DSSAT Shell v2.1

WMAKER COEFFICIENT PROGRAM

After opening the Weather Estimators menu and selecting the WMAKER program, the above screen will appear. Type 'D' to open "D Determine Coefficients" or highlight and press the <ENTER> key.

To use this program, you must have one of the following.

1. Files containing, at a minimum, five years of site weather data stored in IBSNAT ASCII format (see Appendix A in this User's Guide for instructions on creating these files); or

2. The set of eight data measurements required for this model (see Chapter 1 of this User's Guide) plus the latitude and longitude of the site. These data are entered interactively from the keyboard.

The inputs required for WMAKER are:

1. Latitude and Longitude (in degrees) of the site.
2. For each month of the year, the following inputs are needed:
   a. Potential ET (daily mean & standard deviation)
   b. Average temperature (daily mean & standard deviation)
   c. Rainy days (monthly mean & standard deviation)
   d. Rainfall (monthly mean & standard deviation)

OPTIONS:

1. Enter all inputs interactively using the keyboard.
2. Use daily weather data stored as 1 year/file to compute the inputs.
3. Stop the program.

CHOICE: 1

Options 1 and 2

Choose Option 1 or 2 depending on your choice of weather data entry method.

Option 1. Choose this option if you have the required weather data and will input them from the keyboard.
Option 2. Choose this option if you will input weather data using IBSNAT-formatted ASCII files. Option 2, described in the WGEN Coefficient program section, will not be illustrated here. Follow the instructions given for the WGEN Program in the section entitled "Inputting Weather Data."

For this example, choose Option 1.

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Naming the Coefficient file

> The estimated coefficients will be written to a file of your choice. Name of the file [must be 12 characters or less] —> **CCPL6619.WMP**
>
> For future reference, specify a brief (30 characters) description to identify the estimated coefficients.
> Description: **ICA, Colombia (3.48N, 76.37W)**

Th WMAKER program will determine the weather coefficients from your weather data and save them to a file named by you. In the above dialog box, a sample file name is shown. Below, this sample file name with a description of its characteristic is shown. It is recommended that you use this file-naming convention.

CC PL 66 19 WMP

- WMP — WMP to indicate WMAKER program.
- 19 — Number of years of weather data.
- 66 — Last 2 digits of the first year of data (i.e., '66' for 1966)
- PL — Weather station ID code.
- CC — Institute ID code.

Identifying the file

Enter a description for the file. This description should briefly describe the data source. Both the description and the filename will be written to the file WMAKPAR.DIR. The description will be listed as one of the sets of weather coefficients (see Chapter 3) that can be selected by the user to estimate weather data for this site. The sample description shown in the above dialog box is described below.

ICA COLOMBIA (3.48N, 76.37W)

- 76.37W) — Longitude
- (3.48N, — Latitude
- COLOMBIA — Country
- ICA — Experiment site or weather station

INPUTTING DATA

Enter latitude (in degree angles) of the site **3.48**

Enter longitude (in degree angles) of the site **76.37**

1. Enter the latitude and longitude of the experiment site.

For this example, enter the latitude and longitude highlighted in the window above.

For each month enter:
1. Mean potential ET in mm/day
2. Standard deviation of potential ET in mm/day
3. Mean temperature in degrees C
4. Standard deviation of mean temperature in degrees C
5. Mean number of rainy days per month
6. Standard deviation of number of rainy days per month
7. Mean total rainfall in mm/month
8. Standard deviation of total rainfall in mm/month

The above eight values must be entered on a line with one space between values. After typing eight values for a month, press the <ENTER> key.

January	5.384	0.411	24.220	0.739	9.474	4.389	54.579	42.151
Febuary	5.479	0.420	24.401	0.720	10.947	5.930	68.637	49.251
March								

2. Enter the eight values for each month on the same line. typing a space between each value. The eight values per line must be entered in the order in which they appear in the above screen. Press the <ENTER> key when you have completed a line.

For this example, the data values highlighted in the following window are entered.

NOTE: If you press the enter key before entering all eight values for a month, the program will wait until you enter the remaining values. If you make an entry error and you have already pressed the <ENTER> key for a line, you will be given *the opportunity to change each month's values after all 12 months of data have been entered.*

The above eight values must be entered on a line with one space between values. After typing eight values for a month, press the "ENTER" key.

January	5.384	0.411	24.220	0.739	9.474	4.389	54.579	42.151
February	5.479	0.420	24.401	0.720	10.947	5.930	68.637	49.251
March	5.546	0.536	24.484	0.740	12.947	5.939	97.511	59.489
April	5.421	0.695	24.139	0.393	15.263	4.331	137.700	65.752
May	5.000	0.273	23.855	0.463	16.474	4.563	124.895	45.082
June	4.857	0.288	23.816	0.454	12.263	4.420	58.553	33.728
July	5.282	0.317	24.024	0.523	7.789	3.584	27.784	14.730
August	5.349	0.362	24.205	0.525	8.158	4.488	48.500	37.253
September	5.254	0.371	24.022	0.651	12.316	5.121	74.400	44.414
October	5.118	0.312	23.627	0.387	17.053	3.325	140.547	56.111
November	4.999	0.431	23.488	0.452	16.158	4.207	99.847	33.786
December	5.069	0.342	23.711	0.391	11.737	4.267	77.337	47.416

Do you want to change the monthly values [Y/N]? N

Type 'Y' if you have made an error. You will be prompted to enter the month number (i.e., '1' for January, '2' for February, and so on), and then re-enter all eight values.

Type 'N' if all values are correct or when you have finished making corre tions.

End-WMAKER Coefficient Program

You will be returned to the Weather Estimators main menu when the program has completed determining the coefficients.

You may now run the Weather Estimators program by typing 'E'. For instructions go to Chapter 3 of this User's Guide.

Chapter 3
ESTIMATE WEATHER DATA

This chapter describes, with the use of an example, the WGEN and WMAKER weather estimators. It is recommended that you follow the instructions step-by-step with a microcomputer using the estimator for which you have a weather coefficient file.

NOTE: All areas where users must enter a response are highlighted on the screen. Press the <ENTER> key to complete an entry.

It is important that you read the *DSSAT User's Guide-Installation* for set up information before running either the WGEN or WMAKER Weather Coefficient programs.

```
IBSNAT DECISION SUPPORT SYSTEM FOR AGROTECHNOLOGY TRANSFER

DBMS    Crop Models    Applications       Set Up    Quit

                       W Weather Estimators
                       S    G WGEN
                            W WMAKER

                                 D Determine Coefficient
                                 E Estimate Data

Estimated daily Weather data based on coefficients

↑ ↓ → ←   moves you thru menu choices
ESC       key exits the current menu                DSSAT Shell v2.1
```

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NOTE: Make sure all Weather Estimators programs (see Appendix C), coefficien directories, and coefficient files are located in one directory.

WGEN OR WMAKER PROGRAM

Open the Weather Estimators menu if you have not already done so. If yo have weather coefficient files created for both WGEN and WMAKER, you may choose either weather estimator. Otherwise, select the estimator for which you have a weather coefficient file(s). Highlight "E Estimate Data.' Press the <ENTER> key.

ESTIMATE WEATHER DATA

The following screen will appear. Type in the number (2-50) of years for which you want weather estimated.

```
Number of years to be estimated → 50

Drive and path to store estimated data, eg. [A:\]: C:\DSSAT\WGEN
To estimate the weather data, this estimator needs a number of pre-
determined coefficients. These coefficients are stored in files. Select
an appropriate file by typing its number from the list below.

    1. ICA, Colombia (3.48 N, 76.37 W)
    2. Gainesville, Florida
    3. ICRISAT, INDIA

Enter parameter file number → 1
```

NOTE: Approximately 16K of disk space are required to store one year of data. The estimated data are stored in the weather estimator directory defined in the setup. To store this data in another location, specify drive and pathname of existing directory.

File Selection

The descriptive file title of the weather coefficient files will be listed, with the one most recently created listed first. The file descriptions are those entered by the user (see Chapter 2 under either the WGEN or WMAKER section) in the weather coefficients program.

Select, by number, the coefficient file which you want used to estimate weather data.

```
Random number seed selection options [default = 1]
1. Use default values (2510, 7692, 2456, 3765)
2. You specify seed values
Choice:
```

Select Seed Values

The program uses seeds to initialize random numbers from which it estimates simulated weather data values. These seed numbers give the program its starting point. If these values change, the weather pattern for a site will also change.

If you choose Option 1, the program will use the seed default values shown on the above screen. These values will always produce the same weather data values.

Choose Option 2 if you want the program to estimate weather values starting from a different point than that produced by the default seed values. Choose any integer values greater than 0 and equal to or less than 32,767. By inputting the same sequence of seed values, the same weather data values will always be produced.

```
Random number seed selection options [default=1]
1- Use default values (2510, 7692, 2456, 3765)
2- You specify seed values
Choice
 2
Seed value 1 (must be positive & less than 32767) → 19150
Seed value 2 (must be positive & less than 32767) → 6824
Seed value 3 (must be positive & less than 32767) → 329
Seed value 4 (must be positive & less than 32767) → 5
```

If you choose Option 2, enter seed values 1, 2, 3, and 4 when prompted to do so. Press the <ENTER> key after each entry. You will NOT be able to correct your seed values after you enter them. For this example, choose Option 2 and enter the seed values as highlighted in the above screen. After the final entry, the program will estimate the weather data.

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While the program is estimating the data, the message shown below will appear on the screen.

```
Estimating weather data for ICA, Colombia (3.48 N, 76.37 W)
```

Estimated Data Files

After weather data estimation has been completed, you will be returned to the Weather Estimators main menu. Although you will not be shown the name of the file saved, these files are named WGEN0112.W10, WGEN0112.W11, etc. (or WMAK0112.W11, WMAK0112.12, etc.) The file names will be appended to the WTH.DIR directory file.

For instructions on how to view and/or print the files, see Appendix B of this User's Guide.

Appendix A
CREATE AN ASCII-FORMATTED WEATHER FILE

DSSAT WEATHER DATA

If you have entered weather data using the DSSAT Weather Data Entry Program (see *DSSAT User's Guide-Weather Data Entry*), follow the procedure described below.

1. Highlight "DBMS" in the DSSAT main menu, and under "R Retrieval" open "E MDS Data."

2. Select the option "Weather Data" from the MDS Data main menu.

3. Follow the instructions on screen (see "MDS Retrieval for Crop Models" in *DSSAT User's Guide–Weather Data Entry*). Name the file. Exit the program.

OTHER WEATHER DATA

If you have not entered weather data using the DSSAT Weather Data Entry program (see *DSSAT User's Guide–Weather Data Entry*) and your data are not stored in an IBSNAT-specified ASCII file, follow the procedure described below.

1. Highlight "Utilities" in the DSSAT main menu, and then open "Convert Weather ASCII files to DBMS format."

2. Follow the instructions on screen (see *DSSAT User's Guide–Utilities*). Exit the program.

3. Follow instructions numbered 1 to 3 in the above section.

Appendix B
VIEW & PRINT
ESTIMATED WEATHER DATA FILES

When weather data have been estimated, they are saved to a DOS file. If they were estimated by WGEN, they are saved to a DOS file named WGEN0112.WXX, where 'XX' is a two-digit number (e.g., WGEN0112.W11, WGEN0112.W12, etc.). If estimated by WMAKER, they are saved to a DOS file named WMAK0112.WXX (e.g., WMAK0112.W11, etc.). These files are stored by default in the weather directory defined using Setup in the DSSAT main menu. To view and/or print these files, follow the procedure described below.

1. After weather data have been estimated, exit the Weather Estimator program. Exit DSSAT.

2. At the DOS prompt, access the weather directory by typing the following:

    > cd \DSSAT\WGEN   <RETURN>

4. List the files in the directory by typing the following at the DOS prompt:

    > dir/w   <RETURN>

View Files on Screen

1. Locate the file you wish to view. If more than one file are listed, you may not know which WGEN0112.WXX or WMAK0112.WXX file contains the data you wish to view. By typing the following at the DOS prompt for each file name listed, you will be able to view the contents of all the files in the directory. The "MORE" option causes printing to stop every 20 lines.

    > Type <filename>|MORE <RETURN>

EXAMPLE:

    > Type WGEN0112.W11|MORE <RETURN>

2. When the end of the file is reached, the DOS prompt will appear.

Print Files

1. Locate the file you wish to print.

2. At the DOS prompt, type the following to print the files:
   > Copy <filename> prn: <RETURN>

EXAMPLE:
   > Copy WGEN0112.W11 prn: <RETURN>

3. Repeat to print other weather data files.

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Appendix C
WGEN & WMAKER PROGRAMS AND FILE DESCRIPTIONS

PROGRAM DESCRIPTIONS

The DSSAT Weather Estimators program contains the following subroutines or programs.

WGEN

WGENPAR.EXE. The WGENPAR program determines coefficients from daily historic weather data stored in IBSNAT-specified format.

WGENGEN.EXE. The WGENGEN program estimates daily weather data using coefficients determined by WGENPAR.EXE.

WGEN.BAT. The WGEN.BAT is a batch file program that runs the WGENPAR.EXE program.

COEFF.EXE. The COEFF program accesses available historical weather data for use in determining coefficients.

WMAKER

WMAKRPAR.EXE. The WMAKRPAR program enables interactive input of the coefficients and/or determines the coefficients from daily historic weather data stored in IBSNAT-specified format.

WMAKRGEN.EXE. The WMAKRGEN program estimates daily weather data using coefficients determined by WMAKRPAR.EXE.

WMAKER.BAT. The WMAKER.BAT is a batch file program that runs the WMAKRPAR.EXE program.

COEFF.EXE. The COEFF program accesses available historical weather data for use in determining coefficients.

COEFFICIENT FILE NAME DESCRIPTIONS

WGEN

WGENPAR.DIR. This is a file of estimated coefficient file names for use by the WGEN estimator.

WMAKER

WMAKPAR.DIR. This is a file of estimated coefficient file names for use by the WMAKER estimator.

Appendix D
SAMPLE
WEATHER COEFFICIENT FILES

```
Gainesville Florida    Used 22 years of input data.
 29.63         82.37     2      0
 .385  .417   .404   .382   .475    .596   .608   .619   .544   .443  .382   .400  P(W/W)
 .238  .243   .212   .149   .173    .292   .447   .435   .271   .158  .147   .182  P(W/D)
 .722  .667   .749   .635   .725    .718   .790   .720   .679   .735  .665   .545  ALPHA
15.02 21.30  16.67  22.23  17.73   18.14  13.88  17.81  18.01  11.74 15.29  19.11  BETA
      27.8400          -6.7234        -1.7688        -1.1287        -.3134
       3.6216           1.9159         1.6064         -.5491         .5724
      26.8997          -6.0356        -2.0752         -.6033        -.2470
       3.1792           1.2170          .4291          .0912         .1020
      14.6885          -7.3368        -3.1503         -.8640         .0902
       4.4997           2.8630         1.7942         -.8961         .0232
      17.7956          -.56413         2.0928        -1.1515        -.2381
       3.2880           -.3295          .4634         -.2845         .1216
      13.7265          -5.8248          .7536         -.3379         .0436
       4.5222           -.4842          .8808         -.6242         .0159
  19.3  21.3   25.4   28.0  31.0    32.6   33.0   32.8   31.6   28.7  24.6   21.4
   5.6   7.1   11.3   13.6  17.1    20.6   21.9   21.8   20.6   16.5  11.4    7.9
```

WGEN DATA FILE

All inputs in this file are in free format. That is, there are one or more blank spaces between any two entries. The temperature units are in degree centigrade; radiation is in MJ/m^2/day. Detailed descriptions of the coefficients may be found in Richardson and Wright (1984).

File Line Descriptions

Line 1: Description of the source/site of weather data and number of years used in estimating coefficients.

Line 2: Latitude in degrees.
Longitude in degrees.
Temperature correction factor code: (KTCF)

0–No temperature correction
1–If same correction factor for maximum and minimum temperatures
2–If independent correction factor for maximum and minmum temperatures

Precipitation correction factor (KRCF):
0–No precipitation correction
1–Precipitation correction

LINE 3: 12-monthly probability of wet day given a wet day on previous day.

LINE 4: 12-monthy probability of wet day given a dry day on previous day

LINE 5: 12-monthly values of gamma distribution shape parameter.

LINE 6: 12-monthly values of gamma distribution scale parameter.

LINE 7: Five coefficients of two harmonic Fourier series for maximum temperature on dry days.

LINE 8: Five coefficients of two harmonic Fourier series for standard deviation of maximum temperature on dry days.

LINE 9: Five coefficients of two harmonic Fourier series for maximum temperature on wet days.

LINE 10: Five coefficients of two harmonic Fourier series for standard deviation of maximum temperature on wet days.

LINE 11: Five coefficients of two harmonic Fourier series for minimum temperature on dry and wet days.

LINE 12: Five coefficients of two harmonic Fourier series for standard deviation of minimum temperature on dry and wet days.

LINE 13: Five coefficients of two harmonic Fourier series for solar radiation on dry days.

LINE 14: Five coefficients of two harmonic Fourier series for standard deviation of solar radiation on dry days.

LINE 15: Five coefficients of two harmonic Fourier series for solar radiation on wet days.

LINE 16: Five coefficients of two harmonic Fourier series for standard deviation of solar radiation on wet days.

NOTE: This will be the end of this file unless KTCF and/or KRCF have been assigned non-zero values.

If KTCF =1,

LINE 17: 12-monthly values of actual mean temperature.

If KTCF =2,

LINE 17: 12-monthly values of actual maximum temperature.
LINE 18: 12-monthly values of actual minimum temperature.

If KRCF =1

LINE 18 OR
LINE 19: 12-monthly values of actual mean precipitation in mm.

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Gainesville Florida   Used 22 years of input data
29.63 82.37

2.205	.230	12.451	1.580	8.636	2.441	93.686	60.150
2.883	.385	14.203	2.501	8.227	2.045	116.923	42.187
4.173	.795	18.346	6.153	8.182	2.805	102.200	64.811
5.498	.524	20.802	1.196	5.864	2.783	82.823	63.778
6.265	.430	24.063	7.591	7.591	3.232	97.609	61.522
6.201	.395	26.596	.832	12.500	2.841	162.818	86.616
6.107	.324	27.436	.578	16.500	3.764	180.877	60.724
5.671	.269	27.343	.382	16.545	4.044	212.105	86.961
4.888	.503	26.110	.650	11.227	4.197	137.273	99.414
3.940	.272	22.610	1.136	6.818	3.500	58.782	40.167
2.875	.227	18.001	1.993	5.818	2.805	59.145	32.370
2.166	.246	14.653	2.118	7.227	2.181	75.236	53.300

8.000000E-01   2.000000E-01

WMAKER DATA FILE

All inputs in this file are in free format. That is, there are one or more blank spaces between any two entries. The potential evapotranspiration (ET) is in mm/day; temperature units are in degrees centigrade; rainfall is in mm/month. Detailed descriptions of the coefficients may be found in Keller (1982,1985).

File Line Descriptions

Line 1: Description of the source/site of weather data and number of years used in generating coefficients.

Line 2: Latitude in degrees.
Longitude in degrees.

Line 3-14: Each line of lines 3 through 14 contains the following data for each month of the year starting with January and ending in December.
Mean potential ET (mm/day).
Standard deviation of potential ET (mm/day).
Mean monthly temperature (degree C/day).
Standard deviation of mean temperature (degree C/day)

Mean rainy days (days/month)
Standard deviation of rainy days (days/months)
Mean monthly rainfall (mm/month)
Standard deviation of monthly rainfall (mm/month)

LINE 15: This line contains two constants for the ratio of solar radiation at the earth's surface to that of the radiation above the atmosphere for the site. The first constant is the maximum ratio and the second constant is the minimum ratio.

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Table of Contents
STRATEGY EVALUATION

Chapter 1
INTRODUCTION

Agricultural decision makers are faced with economic risks because of the uncertainties associated with both the production and marketing of crops. Each farmer and his farm are unique, requiring the matching of technology to the specific combination of agroenvironmental conditions of the farm and resource base of the farmer. Given the limited resources for agricultural experiments, full representation of farm level outcomes for risk analysis is an unrealistic goal. Systems analysis and validated simulation models provide an alternative method for representing the production problem. The concept of simulation is much more flexible and the simulated data have several advantages compared to historical data. Using models, crop growth and development can be readily evaluated under a wider range of management and environmental conditions than could normally be experienced under typical experimental conditions. Other advantages are that simulation does not require historical production data, and a longer time series of new crops or production practices can often be simulated than would usually be historically available. A simulated time series reflects the effects of a stochastic environment under a constant technology which precludes the need for separating out technological influences.

Strategy evaluation is a versatile, flexible, and powerful tool that can be used to evaluate production strategies rapidly. Some of the most obvious applications of strategy evaluation include:

1. Determination of best planting date or dates.
2. Determination of optimal plant population.
3. Timing and amount of irrigation.
4. Timing and amount of fertilizer.
5. Yield potential of varieties.
6. Response of management practices on various soil types.
7. Comparison of different crops in the same location, soil, and under similar management practices.
8. Stochastic dominance analysis of economic returns.

Strategy Selection in an Uncertain Environment

Risk and uncertainty in agriculture are largely due to the uncertainty surrounding weather, disease and pests, and changing prices and costs. A distinction is sometimes made between risk and uncertainty in terms of the ability of the decision maker to attach mathematical probabilities to one of a set of possible outcomes. Risk is then the situation characterized by the fact that one can insure against it. Uncertainty, on the other hand, is characterized by the situation where little or no knowledge exists, and it is not possible, on the basis of the decision maker's previous direct experience, to set probabilities relating to the likely occurrence of particular outcomes. In farming, it may be possible to conclude that 2 years out of 10 will result in very low yields, for example, although it is usually uncertain when the two bad years will occur. Farmers, like all decision makers, do not have perfect knowledge about the future, and thus they have to formulate their plans under conditions of imperfect information. The farmer can be helped, however, to make the best possible decision in the light of all facts available to him at the time the decision must be made.

With this idea in mind, strategy evaluation offers a means to develop alternative strategies that can then be analyzed in terms of year-to-year variability in yield as a result of particular irrigation water usage, fertilizer applications, and so on. The techniques included in the Strategy Evaluation application are firmly rooted in a widely-used theory of economic decision making under risk, known as Utility Theory. The results of simulations involving the running of combinations of inputs, defined by the user, across many different weather patterns can be analyzed in a number of ways. Farmers will often use a variety of criteria for deciding between appropriate management inputs for their particular situation, and the techniques included in the program provide a useful and flexible starting point for the detailed analysis of simulation results. The DSSAT Strategy Evaluation program allows the user to perform both variability analysis and stochastic dominance analysis. The former is used to analyze non-monetary simulation outputs, while the latter can be used to assess the economic performance of particular input combinations.

Variability Analysis

Variability analysis allows the user to compare strategies in terms of simulation outputs such as yield, irrigation water requirements and fertilizer uptake. Means and standard deviations are calculated for all such variables across years. Results are presented graphically in two ways: a plot of mean against variance (the square of the standard deviation) for each strategy, and a cumulative probability function (CPF) plot. Up to a maximum of six strategies may be plotted on each graph. CPFs are derived by sorting the simulation output variable of interest into ascending order, each value being equivalent to a particular simulated 'season'. The ordered points are then plotted against the appropriate increment of cumulative probability. For instance, if the user carries out a simulation over ten years, each simulation result is equivalent to a probability of 1/10, or 0.1.

Variability analysis involves the pair-wise comparison of the cumulative probability functions of the strategies defined by the user. The program attempts to find the strategy or strategies that result in the greatest response for the selected output variable. In a pair-wise comparison, one strategy will dominate another if its CPF lies to the right of the CPF of the other strategy over its entire range. In such a case, for all the climate conditions considered, the strategy whose CPF lies entirely to the right performs better, over the long term, than its rival. This means that if the CPFs of two strategies, A and B, cross at least once, then the analysis is not able to lead to an unequivocal choice of one strategy over the other. Over some part of the probability interval, strategy A will give a better response, while over some other part, B will give a better response. In such a case, neither A nor B is said to dominate the other.

The lower and upper ends of a CPF give the extremes of the range of the output variable under analysis. From the CPF, the probability associated with different levels of response can be estimated.

Stochastic Dominance Analysis

The net return from a set of user-defined strategies can be analyzed using first- and second-order stochastic dominance (FSD and SSD, respectively). The stochastic dominance techniques also make use of cumulative probability functions. These are examples of efficiency rules. Application of such rules allows the user to divide the strategies under consideration into two sets: dominant and dominated. A decision maker who abides by the largely reasonable behavioral assumptions of Utility Theory will always choose a dominant strategy. It will sometimes happen that there will be more than one dominant strategy after application of the efficiency rules. In such a case, choice is then left to the individual, as it will depend on his degree of aversion to risk.

First-order stochastic dominance (FSD) criterion. FSD is the simplest and most universally applicable efficiency criterion. A strategy dominates another strategy in the sense of FSD if its CPF lies everywhere to the right of the CPF of the dominated strategy. No assumptions are made as to the risk attitudes of the user. It is simply assumed that the decision maker would prefer more net revenue to less. If FSD identifies more than one dominant strategy, then the second-order rule can be used in an attempt to reduce the size of the efficient set containing the dominant strategies.

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Second-order stochastic dominance (SSD) criterion. This decision analysis procedure involves a comparison of the areas under the CPFs for the strategies under consideration, in terms of net revenue. There is no graphical illustration of this procedure, and it is treated in a purely mathematical fashion in the program. In addition to the assumption that the decision maker would prefer more income to less, SSD assumes that he or she is averse to risk to some unspecified degree. For most agricultural decision makers, this is a reasonable assumption. If there is still more than one dominant strategy, then choice of which is the 'best' strategy will depend on further information on the attitude to risk of the decision maker, beyond the fact that he or she is averse to risk. For many situations, SSD will be sufficiently powerful to reduce the number of dominant strategies to one or two only.

CHAPTER 2
STRATEGY SETUP, SIMULATION, AND ANALYSIS

STRATEGY SETUP

In the Strategy Setup section of the Strategy Evaluation program, the user selects the parameters for the simulation and analysis sections that follow by defining his objectives, developing strategies, and choosing a weather estimator (see Chapter 3).

Objectives

The user defines his objectives for the investigation in terms of biological yield or net return; for example, determining if a particular crop can be grown in an area. These objectives should be defined in terms of hierarchial requirements. First, the user chooses the crop. Then he selects one of the weather estimator programs or historical weather data. To get a more reliable evaluation, especially in an environment where there is wide climatic variation, the user would then need to decide the duration of analysis. As a rule of thumb, the duration should be long enough to characterize variation or cycles in the local climate. Choosing a 50-year analysis, for example, would ensure that the simulation covered both 'good' and 'bad' years. The weather estimator requires a number of predetermined coefficients to generate the weather at a location, and the period of generated weather must be at least 2 years and not more than 50 years. (Refer to *DSSAT User's Guide–Weather Estimators* for details regarding these programs.)

Developing Strategies

The user develops strategies to attain the defined objectives by, for example, using specific soils and crop cultivars and by varying planting dates to test the effects of weather. In addition to these strategies, management inputs can also be varied, i.e., fertilizer application, time, amount, type; irrigation amounts and methods; and so on. There is a limit of 15 strategies per Strategy Evaluation session. These 15 can be linked to one crop or to a number of crops, depending on the user's objectives.

STRATEGY SIMULATION

When all the strategies are defined, appropriate crop models are selected to simulate yield without further inputs from the user. Each crop model creates an output file, commonly referred to as FILE5, with a generic name

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OUT5.XX, where XX stands for the two character crop code (MZ for maize, PN for peanut, etc.). During strategy setup, if more than one crop model is used, all the output files are copied to a common output file called OUT5.COM. For example, if strategies were developed for both soybean and maize, then OUT5.SB and OUT5.MZ would be copied to a file called OUT5.COM (the default name), and this file would be used for strategy evaluation. Each time the strategy setup procedure is used to create simulated outputs, the original output FILE5 is overwritten with the new results. Therefore, if the results from a strategy setup are to be saved for future use, these files need to be given a unique name (other than the default name, OUT5.XX) or saved to a disk. The file may be saved to a permanent file after either the Strategy Simulation or the Evaluation sessions.

STRATEGY ANALYSIS

A detailed example of the Strategy Analysis program can be found in Chapter 5 of this User's Guide. For each simulated strategy, the program sorts the results for each variable in ascending (from smallest to biggest) order. Using these sorted results, a cumulative probability distribution function (CPD) is developed for each strategy and used in the analysis. For non-monetary variables (i.e., yield, rainfall, irrigation applied, etc.), a variability analysis is performed, and for net returns, a stochastic dominance analysis.

Introduction to
CHAPTERS 3, 4, and 5

In Chapters 3, 4, and 5, an example is used to demonstrate the operation of the Strategy Evaluation program. Chapter 3 demonstrates Strategy Setup; Chapter 4, Strategy Simulation; and Chapter 5, Strategy Analysis. The resulting output data provide a sample set for reference and for comparing users' results.

It is recommended that users do more than read through these three chapters; they should follow the instructions step-by-step, with a microcomputer, to gain familiarity with and confidence in the Strategy Evaluation program. Users should also read Chapters 1 and 2 before running the program.

NOTE: Because of storage requirements, the Strategy Evaluation program ***requires a hard disk.*** *A floppy-disk drive system cannot be used. If you encounter any problems while running the program, consult Chapter 6 in this User's Guide.*

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Chapter 3
STRATEGY EVALUATION SESSION-STRATEGY SETUP

This chapter demonstrates the Strategy Setup section of the Strategy Evaluation program, with detailed descriptions of the setup criteria and procedures for their selection.

NOTE: All areas where users must enter a response are highlighted on the screens. Press the <ENTER> key to complete a response.

In the Strategy Setup of the Strategy Evaluation program, the user does the following.

1. Defines the objectives of the investigation.
2. Selects the crop(s) of interest.
3. Selects the site.
4. Chooses the weather generator program.
5. Selects the duration of analysis.
6. Develops strategies by selecting crop variety, soil type, planting date, plant population, irrigation and fertilizer methods and amounts, etc. to satisfy the objectives of the investigation.

Example Description

The objective of this example run is to determine from the six dates listed below the best planting date for soybeans. The cultivar, management, and soil specifications given below are the same for each date.

Planting dates:	APR-15,MAY-15,JUN-15,JUL-15,AUG-15,SEP-15
Beginning dates:	APR-14,MAY-14,JUN-14,JUL-14,AUG-14,SEP-14
Variety:	Bragg
Density:	35 plants/m2
Row spacing:	0.76 m
Irrigation:	Rainfed
Fertilizer:	Optimum fertility
Soil:	Millhopper fine sand

The six dates with their specifications constitute the six strategies. Each strategy will be simulated for 30 years using weather data estimated by the WMAKER model.

MAIN MENU FOR STRATEGY EVALUATION

Use the horizontal arrow key to highlight "Applications" within the DSSAT main menu and then select "S Strategy Evaluation" by typing 'S'. This will execute the Strategy Evaluation program. The Strategy Evaluation main menu screen will appear (see below) consisting of three windows. The introduction window (top left corner), the status window (top right window), and a dialog box (lower half of the screen). On the next few pages, the instruction and status windows of the screen will not be shown if they remain unchanged.

```
Introduction
Strategy evaluation allows a
decision maker to rank crop
management strategies with
respect to uncertainties in
crop production indicators
(such as yield) and associated
economic risks in response to
different weather sequences.

Strategy Window

Crop Model Selection Window
Code    Model
MZ      Maize
PN      Peanut
SB      Soybean
WH      Wheat

Type Crop Code to select a model →  SB

IBSNAT Strategy Evaluation v2.1
```

STRATEGY SETUP SELECTIONS

Crop

Select a crop from the dialog box by typing in the code letters representing the crop.

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Strategy Evaluation Options

Define strategies for simulation 1
Analyze previously simulated strategies ... 2
Option→ 1

Define or Analyze
Option 1 in the above screen allows you to define strategies for your simulation. Option 2 analyzes strategies which have already been defined and simulated. If you have simulated strategies at a previous time and wish to analyze them now, choose Option 2 and go to Chapter 5 in this User's Guide.

Weather Data Specifications

Select Weather Data Source
1–WGEN–coefficients derived using daily data
2–WMAKER–coefficients derived from monthly data
3–Available weather data, stored as 1 year/file
Choice → 2

Weather Data Source
Options 1 and 2. Choose one of these options if you want the program to estimate weather data from WGEN or WMAKER derived coefficients (refer to *DSSAT User's Guide–Weather Estimators* for detailed descriptions of these two weather estimator programs).
Option 3. Choose this option if existing weather data has been entered using the Weather Data Entry program (see *DSSAT User's Guide–Weather Data Entry*), retrieved by the Retrieval for Crop Models program (see *DSSAT User's Guide–MDS Retrieval for Crop Models*), and stored in the historical weather directory.

Options 1 and 2 (WGEN, WMAKER)

If you choose one of these two options, the following screens will appear.

```
Weather Data Specifications

OPTIONS:
0. Continue with analysis
1. Analysis Duration [Default value = 25 years]
2. Quit Strategy Evaluation Program
Select option →  1
Analysis Period [2 to 50 years] →   30
```

Duration of Analysis. Enter the length of the analysis period, type '0' to continue the program, and press the <ENTER> key.

NOTE: If your hard disk does not have enough space to save simulation results for the entered number of years, you will be prompted to reduce the number of years or quit the program (Option 2) in order for you to delete or remove files on the hard disk and make more space.

```
Weather Data Specifications

1 Gainesville, Florida  29.6N 82.4
2 ICRISAT Center, INDIA


Select site from above list for strategy evaluation  →  1
```

Weather Data Sites. This screen lists the description titles of sites with coefficient files. Select, by number, the weather data site and, then, the weather data you want the program to use for the simulation.

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Weather Data Specifications

```
Random number seed selection options
1 – Use default values (2510, 7692, 2456, 3765)
2 – You specify seed values
Choice→  2
```

INITIAL SEED VALUES. The program uses seed values (numbers) from which it generates simulated weather data values (see *DSSAT User's Guide– Weather Estimators* for a detailed explanation of this process). If you choose Option 1, the program will use the default seed values shown on the above screen. These values will always produce the same weather data values.

If you want the program to generate different weather values than those produced as a result of the default seed values, you should choose Option 2. With this option, you can choose any integer value greater than 0 (zero) and less than 32,767.

Weather Data Specifications

```
Random number seed selection options
1 – Use default values (2510, 7692, 2456, 3767)
2 – You specify seed values

Choice?  2
Seed #   [4]:  (must be positive & less than 32767)→  5
```

For this example, enter the values 19150, 6824, 329, and 5 for seed numbers 1 through 4, respectively.

Dialog Window

```
Initializing Strategy...
```

Option 3 (Available Weather Data)
If you choose this option, the following screen will appear.

```
═══════════ WGEN–Coefficient Estimation ═══════════

  Weather Data Directory is C:\DSSAT\HISTDATA\
  0–Continue with current path   1–specify new path →  0
```

If the default drive and pathname shown on the screen are not correct, type '1' and specify the drive and pathname where available weather data reside.

```
═══════ Weather directory is C: \DSSAT\HISTDATA ═══════

  SN        Site     Yrs
   1        ITIM     12

  Select sequence number (SN) of weather data [or 0 to Exit] →  1
```

Weather Data Sites. This screen lists the description titles of sites with coefficient files. If weather data files were entered using the DSSAT Weather Estimators Program (see *DSSAT User's Guide–Weather Estimators*), the names of these files should appear in this screen. The Weather Estimators program (WGEN or WMAKER) will use the selected filename to find the coefficients for estimating data for this site. Select the site, and thus the available weather data you want the program to use in the analysis, by entering its sequence number (SN).

If no sites with long-term weather data exist in the weather directory, you will be prompted to enter a pathname where such data reside, or quit the program.

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Strategy Analysis Specifications

OPTIONS:
0. Continue with analysis
1. Analysis Duration [Current value = 12 years]
2. Quit Strategy Evaluation Program

Selection by number→ 1

Analysis Period [2 to 12 years] → 12

Duration of Analysis. Enter the length of the analysis period, type '0' to continue the program, and press the <ENTER> key.

Dialog Window

Initializing Strategy...

MAIN MENU FOR STRATEGY SETUP

In the right hand window of the Strategy Setup main menu screen, the left column lists the specifications which must be defined for a strategy analysis. The values in the right column are default values taken from data found in the Experiment directory. As you select different values for these specifications, the values in the right column will change to reflect your choices. If you make an error in any of the specification values you select, retype the letter corresponding to the specification and enter the correct value.

Introduction

Strategy Evaluation allows a decision maker to rank crop management strategies with respect to uncertainties in crop production indicators (such as yield) and associated economic risks in response to different weather sequences.

Soybean 30 Years Strategy Generator

V	Crop Variety....	BRAGG
P	Planting Date...	JUN-15
B	Beginning Date	JUN-14
D	Plants/m^2......	29.90
R	Row Spacing....	0.914 m
S	Soil Type...........	DEEP SILTY CLAY
I	Irrigation...........	Rainfed
F	Fertilization......	No stress
C	Ini. Condition...	Default
E	End of definition for Strategy	1

OPTION [Q-uit evaluation] V

Dialog Window

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STRATEGY SETUP SELECTIONS (CONTINUED)

Crop Variety

After entering 'V', press the <ENTER> key to get a list of available crop model cultivars. For this example, press the <ENTER> key to see the listing.

Introduction

Strategy Evaluation allows a decision maker to rank crop management strategies with respect to uncertainties in crop production indicators (such as yield) and associated economic risks in response to different weather sequences.

Soybean 30 Years Strategy Generator

V	Crop Variety....	BRAGG
P	Planting Date...	JUN-15
B	Beginning Date	JUN-14
D	Plants/m^2......	29.90
R	Row Spacing....	0.914 m
S	Soil Type..........	DEEP SILTY CLAY
I	Irrigation...........	Rainfed
F	Fertilization......	No stress
C	Ini. Condition...	Default
E	End of definition for Strategy	1

OPTION [Q-uit evaluation] V

Dialog Window

1	BRAGG	11	EVANS	24	LEE-74
2	COBB	12	JUPITER	25	GOVAN
3	WAYNE	15	KAOHSIUNG 8	26	HARDEE
6	RANSOM	20	HILL	27	VICOJA
8	FORREST	21	DAVIS	32	PK-7394
9	WILLIAMS	22	TRACY	33	PAPILLON
10	WILLIAMS-82	23	BRAXTON	38	MG-00 GENERAL

B-ack to beginning, M-ore, OR Enter variety number →

IBSNAT Strategy Evaluation v2.1

The above screen lists the soybean varieties available in the DSSAT genetic file of the soybean model data subdirectory. If the crop chosen for this simulation run had been maize, the varieties listed in this screen would have been those found in the DSSAT genetic file for maize; and so on, for every other DSSAT crop model. Thus, for each chosen crop, a specific listing of cultivars will be available, and the cultivar specification must be chosen from this list.

NOTE: When there are more listings then can be displayed on a single screen, use the <M> key to scroll the screen display and the <B> key to return to the beginning of the listing.

Introduction

Strategy Evaluation allows a decision maker to rank crop management strategies with respect to uncertainties in crop production indicators (such as yield) and associated economic risks in response to different weather sequences.

Soybean 30 Years Strategy Generator

V	Crop Variety....	BRAGG
P	Planting Date...	JUN–15
B	Beginning Date	JUN–14
D	Plants/m^2......	29.90
R	Row Spacing....	0.914 m
S	Soil Type..........	DEEP SILTY CLAY
I	Irrigation..........	Rainfed
F	Fertilization......	No stress
C	Ini. Condition...	Default
E	End of definition for Strategy	1

OPTION [Q-uit evaluation] **P**

Dialog Window

Month → **APR**

Day of the Month → **15**

IBSNAT Strategy Evaluation v2.1

Planting Date

After selecting 'P', enter the first date, 'APR' and then the day of the month, '15'.

Beginning Date

After selecting 'B' enter the first simulation date, 'APR-14', in the same way you entered the planting date.

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Introduction

Strategy Evaluation allows a decision maker to rank crop management strategies with respect to uncertainties in crop production indicators (such as yield) and associated economic risks in response to different weather sequences.

Soybean 30 Years Strategy Generator

V	Crop Variety....	BRAGG
P	Planting Date...	APR–15
B	Beginning Date	APR–14
D	Plants/m^2......	29.90
R	Row Spacing....	0.914 m
S	Soil Type..........	DEEP SILTY CLAY
I	Irrigation...........	Rainfed
F	Fertilization......	No stress
C	Ini. Condition...	Default
E	End of definition for Strategy	1

OPTION [Q-uit evaluation] D

Dialog Window

Planting density —Plants/m^2 → 35

IBSNAT Strategy Evaluation v2.1

Plant Density

After selecting 'D', enter '35' (for 35 plants/m^2) for this example.

Introduction

Strategy Evaluation allows a decision maker to rank crop management strategies with respect to uncertainties in crop production indicators (such as yield) and associated economic risks in response to different weather sequences.

Soybean 30 Years Strategy Generator

V	Crop Variety....	BRAGG
P	Planting Date...	APR–15
B	Beginning Date	APR–14
D	Plants/m^2......	35
R	Row Spacing....	0.914 m
S	Soil Type...........	DEEP SILTY CLAY
I	Irrigation...........	Rainfed
F	Fertilization......	No stress
C	Ini. Condition...	Default
E	End of definition for Strategy	1

OPTION [Q-uit evaluation] **R**

Dialog Window

Spacing between rows in meter → **0.76**

IBSNAT Strategy Evaluation v2.1

Row Spacing

After selecting 'R', enter '0.76' (for 0.76 meter between rows) for this example.

NOTE: Wheat and maize models do not simulate row spacing, and therefore, if these crops have been selected, the row spacing default value cannot be changed.

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Introduction

Strategy Evaluation allows a decision maker to rank crop management strategies with respect to uncertainties in crop production indicators (such as yield) and associated economic risks in response to different weather sequences.

Soybean 30 Years Strategy Generator

V	Crop Variety....	BRAGG
P	Planting Date...	APR-15
B	Beginning Date	APR-14
D	Plants/m^2......	35
R	Row Spacing....	0.760 m
S	Soil Type..........	DEEP SILTY CLAY
I	Irrigation..........	Rainfed
F	Fertilization......	No stress
C	Ini. Condition...	Default
E	End of definition for Strategy	1

OPTION [Q-uit evaluation] S

Dialog Window

Soil Type Number [or press ↵ for a list] →

IBSNAT Strategy Evaluation v2.1

Soil Type

After selecting 'S', either enter the soil type number if you know it or press the <ENTER> key to get a list of available soil types. For this example, press the <ENTER> key to see the listing.

Introduction
Strategy Evaluation allows a decision maker to rank crop management strategies with respect to uncertainties in crop production indicators (such as yield) and associated economic risks in response to different weather sequences.

Soybean 30 Years Strategy Generator

V	Crop Variety....	BRAGG
P	Planting Date...	APR-15
B	Beginning Date	APR-14
D	Plants/m^2......	35
R	Row Spacing....	0.760 m
S	Soil Type...........	DEEP SILTY CLAY
I	Irrigation...........	Rainfed
F	Fertilization......	No stress
C	Ini. Condition...	Default
E	End of definition for Strategy	1

OPTION [Q-uit evaluation] **S**

Dialog Window

8	MEDIUM SANDY LOAM
9	SHALLOW SANDY LOAM
10	DEEP SAND
11	MEDIUM SAND
12	SHALLOW SAND
13	Waipio (Clayey, kaolinitic, isohyperth, Tropeptic Eutrustox)
14	Millhopper Fine Sand (Loamy, silic, hyperth Arenic Paleudult)

B-ack to beginning, M-ore, or Enter soil number → **14**

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The above window shows one page of the soil types available in the Soil Profile found in file SPROFILE.SB2, where SB indicates soybean. If the crop chosen for this simulation run had been maize, the soil types listed in this screen would have been those found in SPROFILE.MZ2 of the Maize data directory. Thus for each chosen crop, a specific listing of soils will be available and the soil type must be chosen from this list.

NOTE: All DSSAT crop models have a common set of soil profiles. However, user-added soil profiles (see DSSAT User's Guide–Soil Data Retrieval for Crop Models*) will not be common to all crop models.*

Select soil number '14' for this example.

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Introduction

Strategy Evaluation allows a decision maker to rank crop management strategies with respect to uncertainties in crop production indicators (such as yield) and associated economic risks in response to different weather sequences.

Soybean 30 Years Strategy Generator

V	Crop Variety....	BRAGG
P	Planting Date...	APR-15
B	Beginning Date	APR-14
D	Plants/m^2......	35
R	Row Spacing....	0.760 m
S	Soil Type...........	Millhopper Fine Sand
I	Irrigation...........	Rainfed
F	Fertilization......	No stress
C	Ini. Condition...	Default
E	End of definition for Strategy	1

OPTION [Q-uit evaluation] I

Dialog Window

1 Rainfed
2 Pre-scheduled irrigations–needs Date and Amount
3 Automatic Irrigation–needs Depth and Available water.
4 Well irrigated

Irrigation strategy → 1

IBSNAT Strategy Evaluation v2.1

IRRIGATION

Select 'I' and choose any of the irrigation schedules listed by selecting the number corresponding to an option.

Introduction

Strategy Evaluation allows a decision maker to rank crop management strategies with respect to uncertainties in crop production indicators (such as yield) and associated economic risks in response to different weather sequences.

Soybean 30 Years Strategy Generator

V	Crop Variety....	BRAGG
P	Planting Date...	APR-15
B	Beginning Date	APR-14
D	Plants/m^2......	35
R	Row Spacing....	0.760 m
S	Soil Type..........	Millhopper Fine Sand
I	Irrigation..........	Rainfed
F	Fertilization......	No stress
C	Ini. Condition...	Default
E	End of definition for Strategy	1

OPTION [Q-uit evaluation] **F**

Dialog Window

Fertilizer strategy is not simulated for this crop. Press the ↵ key

IBSNAT Strategy Evaluation v2.1

Fertilizer

For the soybean and peanut models, no fertilizer strategy is currently available and the above message will appear in the dialog window. Fertilizer options will appear in the dialog window for Maize, Wheat, and other models with these options. If one of these models have been selected, the following dialog window will appear after selecting 'F', and you will be able to select a strategy from among them.

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Dialog Window

Enter Day after planting [DAP], amount [kg]
depth of application [cm], & fertilizer code [Ref:TR1].
To end the inputs, enter a negative value for DAP.

To select the correct fertilizer code for entry, refer to IBSNAT TR1, 3rd ed., Form N. Once you have entered all values (i.e., DAP - the elapsed time, in days, between planting of the crop and fertilization; amount of fertilization; the depth of application; and the fertilizer code), the cursor will return to the DAP prompt. If you have made any numerical entry errors, go through the sequence of inputs once more and enter the correct values. Upon completion of inputs, type a negative number (e.g., -9) after the prompt for DAP.

Introduction

Strategy evaluation allows a decision maker to rank crop management strategies with respect to uncertainties in crop production indicators (such as yield) and associated economic risks in response to different weather sequences.

Soybean 30 Years Strategy Generator

V	Crop Variety....	BRAGG
P	Planting Date...	APR-15
B	Beginning Date	APR-14
D	Plants/m^2......	35
R	Row Spacing....	0.760 m
S	Soil Type..........	Millhopper Fine Sand
I	Irrigation..........	Rainfed
F	Fertilization......	No stress
C	Ini. Condition...	Default
E	End of definition for Strategy	1

OPTION [Q-uit evaluation] C

Dialog Window

Initial Conditions Menu:
1. Define soil profile initial conditions.
2. Define crop residue initial conditions.
3. View/edit current soil profile conditions by layer.

Enter 1, 2 or 3 to select an option or 0–for the main menu→ 1

IBSNAT Strategy Evaluation v2.1

INITIAL CONDITIONS

After selecting 'C', define both initial soil profile (Option 1) and crop residue (Option 2) conditions. If you select Option 3 before Option 1 or 2, a

Dialog Window

Enter a soil water index value (0-1) to indicate the soil profile's water condition at planting. A zero (0) indicates that the profile is completely dry at planting and a one (1) indicates the profile is filled to the drained upper limit. A value of 0.5 indicates the profile is half-filled, etc.

Soil Water Index→ 0.5

listing of default variable values for each layer will be presented. Typing '0' will return you to the Strategy Setup main menu window.

Soil Profile

Soil Water Index. The value entered here determines the distribution of SW in the soil's layers. The soil profile you have chosen has default SW values for each layer. These default values will be altered to reflect the affect on them of the value you input here. For this example, enter '0.5' and press the <ENTER> key.

Dialog Window

Soil pH: Range 3 to 9, if you don't know, enter 7
Soil pH: in layer [depth 0-5 cm] 1: 7

pH. At the prompt for each layer, enter the pH value (3-9) for the soil layer if known. Otherwise, enter '7' at each layer prompt.

For this example, enter '7' for all pH values.

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Dialog Window

> Specify total initial soil mineral nitrogen (kg N/ha) content.
> Use the following indicators as guidelines:
> LOW................. < 50 kg N/ha
> MODERATE.... 50-150 kg N/ha
> HIGH................ > 300 kg N/ha
> TOTAL MINERAL N (Range 1-1000 kg N/ha) = **100**

Soil Mineral Nitrogen. The value entered here determines the distribution of NH_4 and NO_3 in the soil's layers. The soil profile you have chosen has default NH_4 and NO_3 values for each layer. These default values will be altered to reflect the effect of the value you input here.

Dialog Window

> Initial Conditions Menu:
> 1. Define soil profile conditions.
> 2. Define soil residue initial conditions.
> 3. View/edit current soil profile conditions by layer.
>
> Enter 1, 2 or 3 to select an option or 0- for the main menu→ **3**

Verify/Edit Initial Conditions

Type '3' to verify, and edit if necessary, the initial soil profile values you have entered; or to view, and edit if desired, the soil default values.

Dialog Window

Var Layer→	1	2	3	4	5	6	7	8	9
↓ DEPTH	5.0	10.0	15.0	15.0	15.0	30.0	30.0	30.0	30.0
1 SW%	5.5	5.5	5.5	5.5	5.5	4.8	4.8	7.8	16.4
2 NH_4ppm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
3 NO_3ppm	14.4	7.2	4.7	4.6	4.4	2.0	1.9	1.8	1.7
4 pH	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0

Do you want to modify any of the computed values (Y/N)?→ **Y**

The above window lists by layer the values you inputted for the initial soil conditions. If any of the values are incorrect, type 'Y' and press the <ENTER> key. The following message will appear in the dialog window. Enter the variable number (the number in the far left-hand column of the dialog window), the layer number (the number in the top row), and the new value.

Repeat until all the values are correct; type a negative number to end the edit routine; and press the <ENTER> key. The initial conditions will appear in the dialog window.

Dialog Window

Var Layer→	1	2	3	4	5	6	7	8	9
↓ DEPTH	5.0	10.0	15.0	15.0	15.0	30.0	30.0	30.0	30.0
1 SW%	5.5	5.5	5.5	5.5	5.5	4.8	4.8	7.8	16.4
2 NH_4ppm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
3 NO_3ppm	14.4	7.2	4.7	4.6	4.4	2.0	1.9	1.8	1.7
4 pH	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0

Do you want to modify any of the computed values (Y/N)?→ N

If all the values are correct, type 'N' and press the <ENTER> key. The initial conditions menu will appear in the dialog box.

Dialog Window

Initial Conditions Menu:
1. Define soil profile initial conditions
2. Define crop residue initial conditions
3. View/Modify current soil profile conditions

Enter 1, 2 or 3 to select an option or 0–for the main menu 2

Crop Residue

Type '2' for Option 2 and a listing of the crop residue inital conditions.

Dialog Window

Current Values of Crop Residue Paramenters
1. Residue incorporated (kg/ha) = 300.0
2. Depth of incorporation (cm) = 30.0
3. C:N ratio of residue = 75.0
4. Estimated Root residue (kg/ha) = 500.0

Enter 1-4 to change current values 0- to save these values → 0

The values listed in this dialog window are default values generated by the program. You may change any of them by typing '1', '2', '3', or '4' , entering the new value, and repeating the sequence until all values you wish to change are entered.

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NOTE: For the soybean and peanut models, the simulation results will not be affected by fertility and crop residue initial conditions because fertilization is not simulated.

Introduction

Strategy evaluation allows a decision maker to rank crop management strategies with respect to uncertainties in crop production indicators (such as yield) and associated economic risks in response to different weather sequences.

Soybean 30 Years Strategy Generator

V	Crop Variety....	BRAGG
P	Planting Date ..	APR-15
B	Beginning Date	APR-14
D	Plants/m^2	35
R	Row Spacing ...	0.760 m
S	Soil Type	Millhopper Fine Sand
I	Irrigation.	Rainfed
F	Fertilization	No stress
C	Ini. Condition ..	Defined

Strategy 1 for Soybean defined.

OPTION [Q-uit evaluation] E

Dialog Window

Enter a UNIQUE title for this strategy.

Title → APR–15

Strategy Evaluation v2.1

End First Setup

Strategy setup has been completed for the first strategy. Type 'E' to end the definition for Strategy 1. The message in the above dialog window will appear. Enter a unique name for the defined strategy.

For this example, type the planting date, 'APR-15', as the unique name for Strategy 1.

Dialog Window

You may simulate up to 14 more strategies.
Do you wish to simulate more strategies for Soybean (Y/N)? → **Y**

Additional Strategy Setups

You may simulate up to 14 more strategies. Choosing 'Y' will return you to the Strategy Analysis main menu where you can repeat the data entry procedure for another strategy.

For this sample example, we wish to simulate six (6) strategies, and thus will need to enter data for five more strategies. However, we will change only the planting and simulation dates for the remaining five strategies; the other conditions and specifications will remain the same as those defined in Strategy 1. Listed below are the five remaining planting and simulation dates.

Planting date:	Beginning date of simulation:
MAY-15	MAY-14
JUN-15	JUN-14
JUL-15	JUL-14
AUG-15	AUG-14
SEP-15	SEP-14

Define the remaining five strategies as follows.

1. Type 'Y' and press the <ENTER> key.
2. Type 'P' and enter the second planting date (i.e., MAY-15).
3. Type 'B' and enter the second simulation date (i.e., MAY-14).
4. Type 'E' and name Strategy 2 (i.e., MAY-15).

Repeat this procedure until the six strategies have been defined and named. When you have named Strategy 6, type 'N' when the message in the window above appears in the dialog window. The following window will appear.

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Dialog Window

Would you like to compare the performance of another crop (Y/N)?→ N

If 'Y' is chosen, you will be prompted for another Crop Code (see this chapter, under the section "Strategy Setup Selections." After the crop code is entered, you will be returned to the Strategy Setup main menu screen where you can define your strategies.

NOTE: To have a second crop grown in the same soil as the first, the soil file (or S/PRO.XX) for the second crop must contain the soil chosen for the first crop. If it does not, you will need to quit the Strategy Evaluation program and create a soil profile (see DSSAT User's Guide–Soil Data Retrieval for Crop Models) *of this soil for the second crop.*

For this example, type 'N' and press the <ENTER> key.

Dialog Window

Simulation may take 4 hours & 45 minutes on a Personal Computer. Estimated time may vary according to the type of computer used.

Do you want to continue with the simulation (Y/N)? Y

If you chose not to continue and quit the program, the strategies you have defined will not be saved. Type 'Y' to continue the analysis. Depending on the crop model, various output screens will appear.

NOTE: You will need to experiment on your machine to arrive at the exact time required to run the simulation. Generalizations for different computer types are difficult to make.

Chapter 4
STRATEGY EVALUATION SESSION-
STRATEGY SIMULATION

This chapter, demonstrates the Strategy Simulation section of the Strategy Evaluation program, using the strategies defined by the user during Strategy Setup (see Chapter 3 of this User's Guide.)

NOTE: All areas where users must enter a response are highlighted on the screens. Press the <ENTER> key to complete a response.

In the Strategy Simulation of the Strategy Evaluation program, the weather data are generated and the crop simulation is run using the strategies selected by the user and the data generated by the Weather estimator.

The simulation of strategies takes considerable time and is dependent upon the number of simulations requested and the type of microcomputer used. When simulation is complete, a listing of each simulation and its status will be given, similar to the listing in the following screen.

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Crop	Strategy	Simulations	Status
SB	1 APR-15	30 of 30	Successful
SB	2 MAY-15	30 of 30	Successful
SB	3 JUN-15	30 of 30	Successful
SB	4 JUL-15	30 of 30	Successful
SB	5 AUG-15	30 of 30	Successful
SB	6 SEP-15	30 of 30	Successful

ALL strategies were successfully simulated.
Graphical analysis of results is possible.
Press ↵ key to continue or Q - to quit.

SIMULATION RESULTS

To view and/or print a graphical presentation of the simulation results, press the <ENTER> key.

If you choose to quit the Strategy Evaluation Program at this point, the strategies which have been simulated will be saved to an output file named OUT5.XX, where XX stands for the crop code. If the file OUT5.XX already exists and contains simulation results, those results will be overwritten at this point.

NOTE: Every crop model, when simulating a defined strategy or strategies, creates an OUT5 file. If more than one crop model is used during strategy setup and simulation, then all the simulation output files are copied to a common output file named OUT5.COM. For example, if strategies were developed for soybean and maize, then OUT5.SB and OUT5.MZ, created by the respective models would be copied to the file OUT5. COM. The OUT5.XX or OUT5.COM file is the default file for Strategy Analysis (see Chapter 5) and contains the most recent set of strategies simulated by the Strategy Evaluation Program.

SAVE SIMULATION

If you choose to quit the Strategy Evaluation program at **ANY** time after strategies have been simulated, the following dialog window will be presented.

If you want the simulation results saved in a permanent file, choose 'Y' at the first prompt.

```
Do you want to save these results in a file (Y/N)?→   Y

File name to save results:→  USERFILE.SB
```

Enter a file name at the second prompt. The program checks if the file name entered matches a file name in the directory. If it does, the program gives you a choice of either renaming the file you have just entered or overwriting the data in the existing file.

For this example, enter the file name, "USERFILE.SB", as shown above.

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Chapter 5
STRATEGY EVALUATION SESSION-STRATEGY ANALYSIS

This chapter demonstrates the Strategy Analysis section of the Strategy Evaluation program, using the set of strategies defined by the user during Strategy Setup (see Chapter 3 of this User's Guide) and subsequently simulated during Strategy Simulation (see Chapter 4).

NOTE: All areas where users must enter a response are highlighted on the screen. Press the <ENTER> key to complete a response.

The Strategy Analysis section of the Strategy Evaluation program uses the results of the simulation to help the decision maker evaluate each strategy setup and select a strategy or strategies that best satisfy the goals of the evaluation. The selected strategy or strategies are commonly referred to as the dominant or efficient strategies. *Variability* analysis and *stochastic dominance* analysis are used, depending on whether the variable analyzed is non-monetary or monetary in nature (see Chapter1).

INTRODUCTION TO STRATEGY ANALYSIS

The following two screens are presented at the beginning of the Strategy Analysis section.

INTRODUCTION TO STRATEGY ANALYSIS (page 1/2)

Agricultural producers are faced with risk because of the uncertainties associated with the production and marketing of crops. Decisions are almost always made with imperfect or incomplete information. Decision analysis is that part of economic theory that deals with decision making under risk, and the techniques included in the Strategy Analysis module are firmly rooted in one of the most widely used parts of this theory (Utility Theory). The results of simulations that involve running user-defined combinations of inputs across many different weather patterns can be analyzed in a number of ways in the module. Often, a variety of criteria have to be examined when choosing the most appropriate set of management inputs for a particular situation; the routines in this module are a useful starting point for analysis of simulation results. Two types of analysis are provided.

(1) The Analysis of Non-Monetary Variables: These include such things as yield, rainfall, and nitrogen uptake by the crop. Means and standard deviations are calculated in the module for all such variables, and results are presented graphically in terms of 1) a plot of each strategy's cumulative probability function (CPF) and 2) a plot of the mean against the variance for each user-defined strategy, up to a maximum of 6 on a graph. The CPFs are derived by sorting values of the variable of interest into ascending order, one particular value being equivalent to a particular "season", and then the

[B–ack; Press ↵ key to continue; Q–uit]

INTRODUCTION TO STRATEGY ANALYSIS (page 2/2)

ordered points are plotted against the appropriate increment of cumulative probability. Thus, if the user carries out a simulation over 10 years, each simulation result is equivalent to a probability of 1/10 or 0.1. This process is referred to in the module as VARIABILITY ANALYSIS.

(2) The Analysis of Monetary Variables: The net return from a set of user-defined strategies can be analyzed using the mean-variance plot and using first- and second-degree stochastic dominance analysis (FSD and SSD, respectively). The stochastic dominance techniques are based on Utility Theory and make use of cumulative probability plots. These are examples of efficiency rules; application of the rules allows the user to divide the user-defined strategies into two sets, dominant and dominated. A decision maker who abides by the (largely reasonable) behavioral assumptions of Utility Theory will always choose a dominant strategy. Note that there may often be more than one strategy in the dominant set; choice is then left to the individual, as choice of one among a set of mutually exclusive alternatives will depend on his degree of aversion to risk. FSD makes no assumptions about the degree of risk aversion; SSD analysis assumes that the decision maker is averse to risk to some (unknown) degree. For the vast majority of agricultural producers, this assumption will be appropriate.

[B–ack; Press ↵ key to continue; Q–uit]

STRATEGY ANALYSIS DATA

Strategy analysis is performed on data stored either in the OUT5.XX file or in a permanent file, saved and named by the user (see Chapter 4).

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The dialog window (below) which follows the introduction screens allows you a choice of analyzing simulation results contained in either the default file (OUT5.SB in this case) or a permanently-saved file.

Input File for Strategy Analysis
Data File: OUT5.SB New file: ? Press ↵ key to retain current choice

If no previous strategy or strategies have been defined, the following statement will appear.

Strategy analysis has no data! T[ry another] or Q[uit]?

For this example, the default file 'OUT5.SB' should not be changed. Press the <ENTER> key. The program will read data for all the strategies from 'OUT5.SB', and when this is done, the following screen will appear.

VARIABLES AVAILABLE FOR ANALYSIS

1. Net Return
2. Flowering-Maturity Duration
3. Sowing-Maturity Duration
4. Total N-loss kg/ha
5. Nitrogen stress in vegetative stage
6. Nitrogen stress in reproductive stage
7. Total Nitrogen uptake kg/ha
8. Number of Irrigation–mm
9. Cumulative Irrigation–mm
10. Water stress in vegetative stage
11. Water stress in reproductive stage
12. Total Evapo-transpiration–mm
13. Total Rainfall–mm
14. Total Biomass–t/ha
15. Grain Yield–t/ha

No.	RUNS	STRATEGIES AVAILABLE
1.	30	SB: APR-15
2.	30	SB: MAY-15
3.	30	SB: JUN-15
4.	30	SB: JUL-15
5.	30	SB: AUG-15
6.	30	SB: SEP-15

Use PAGE UP or PAGE DOWN to see more SELECTIONS

Variability Analysis

1. Variable Analyzed ....Grain Yield–t/ha
2. Strategies Analyzed 6
3. Strategy Numbers 1 2 3 4 5 6
4. ScreenType A
5. Scale/label N : N : N

Select items to specify strategy analysis inputs. Then type A,G or Q.
[A–Analyze strategies; G–Analyze and plot selected strategies; or Q–Quit]

MAIN MENU FOR STRATEGY ANALYSIS

On the top left side of the above screen are listed, by number, the variables that can be chosen for analysis. The strategies (which you have defined and which have been successfully simulated) available for analysis are listed, by number, on the top right of the screen. The bottom half of the screen displays the five (5) options, by number, that enable you to define the parameters for the variability analysis. These five options are defined as follows.

Option 1: Variable Analyzed

1. The default is variable number 15 (Grain Yield–t/ha). If this default is the variable you wish to use, do not select Option 1.

2. To change the default, type '1' and select, by number, from the variables listed, the one you want analyzed. If you select variable #1 (Net Return), an additional option, Option 6–Costs, will appear in the bottom dialog window. This allows you to run a stochastic dominance analysis on selected strategies. See the sections under "First-Order Stochastic Dominance" in this chapter for further explanations of this option.

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Option 2. Strategies Analyzed
Type '2' and enter the number of strategies you wish to have analyzed.

Option 3. Strategy Numbers
Type '3' and enter by number, from the list on the right in the top window of the above screen, the strategy or strategies you want analyzed. You may enter the strategy numbers in any order. The total number of strategies selected must match the number entered for Option 2.

Option 4. Screen Type
This option allows you to select the graphics mode appropriate for your computer.

1. The default for this option is '2' (cgaH). If this is the graphics option you wish to use, do not select Option 4.

2. To change the default, type '4'. The following dialog message will appear on the screen. Choose the screen type which matches your graphics mode. If you are unsure which graphics option to choose, select '1-cgaL' as the safe option. After selecting the screen type, you will be asked if you want this choice saved to a file; type 'Y' or 'N'.

Dialog Window

Screen type [1-cgaL; 2-cgaH; 3-egaL; 4-egaM; 5-egaH]? 1

Option 5. Scale/Label
This option enables you to:

1) select the scale values for either or both the x- and y-axis; and
2) choose to have the lines for each strategy labeled by number on the graphs (the label will be printed to the left of the last plotted point).

1. The default is 'N' for each of these choices. If you do not wish to select scale values or line labeling, do not choose Option 5. The program will scale the axes according to the data being plotted.

2. If you wish to select both x- and y-axis scale values and line labeling, type '5'.

a. Type 'Y' at the prompt in the dialog window for x-axis values. Enter minimum and maximum scale values.
b. Type 'Y' at the prompt for y-axis values. Enter a minimum value > than 0 (zero) and a maximum value ≤ 1.
c. Type 'Y' at the prompt for line labeling.

3. If you wish to select only one or two of these options, type '5'. Type 'N' at each prompt where you do not wish to make a selection and press the <ENTER> key. Type 'Y' at each prompt where you do wish to make a selection and follow the appropriate instruction in #2 above.

Upon completing the selections for Options 1-5, choose 'A' or 'G' to specify the strategy analysis inputs, or 'Q' to quit. The default is Option G, so if 'G' is your choice, press the <ENTER> key and begin the analysis. These three options are defined below:

OPTION A. ANALYZE STRATEGIES
Choose this option if you want more than six strategies to be analyzed. Although the strategies will not be plotted on graphs, summarized screen analysis of each will be given.

OPTION G. ANALYZE AND PLOT SELECTED STRATEGIES
Although you are able to define up to 15 strategies, only six can be plotted at one time. Choose this option if you want six or less strategies (those entered in Option 3) graphed.

OPTION Q. QUIT
You may quit the program at this point by entering 'Q'. You will be given the choice of quitting the Strategy Evaluation program or selecting another file for analysis. If you quit, you will be returned to the DSSAT main menu.

EXAMPLE SELECTIONS

For this example, make the following selections:

1. The default for Option 1 is Grain Yield and since this is the variable we want to analyze, do not select this option.

2. Since 6 strategies were simulated, and we want to analyze all 6, do not select Options 2 and 3.

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3. Type '4', enter the number of your screen type, and press the <ENTER> key. Type 'Y' to save the screen type to a file and press the <ENTER> key. The default for Option 4 is the cgaH screen type.

4. Do not select Option 5.

5. Press the <ENTER> key. Since six strategies are to be analyzed and plotted, and 'G' is the default, do not type in a letter; pressing the <ENTER> key selects 'G'.

Grain Yield –t/ha

No.	Strategy Description	Mean	SD
1	SB: APR-15	2.6237	0.6801
2	SB: MAY-15	3.7790	0.3660
3	SB: JUN-15	3.6113	0.3635
4	SB: JUL-15	2.8580	0.4271
5	SB: AUG-15	1.4430	0.4406
6	SB: SEP-15	0.5557	0.2428

Explanation

VARIABILITY ANALYSIS: This involves a pair-wise comparison of the cumulative probability functions (CPF) of the strategies defined. The program attempts to find the strategy or strategies that result in the maximum response for the selected variable. In a pair-wise comparison, one strategy will dominate another if the CPF lies to the right of another strategy over its entire range; in other words, for all climate conditions considered, the strategy whose CPF lies entirely to the right always performs better than its rival, over the long term, in terms of the variable of interest. Thus, if the CPFs for strategies A and B cross, once or many times, then neither is eliminated from the analysis, since over some of

B–ackward, S-kip or Press ↵ key

Dominant strategy or strategies: 2 3

NOTE: Mean values are shown by vertical arrows in all the plots.

VARIABILITY ANALYSIS

The analyzed strategies with mean and standard deviation (SD) for each appear on the left side of the above screen. The "dominant" strategy or strategies are identified by number at the bottom of the window. A generic explanation for the selection is given in the "Explanation" window on the right of the screen. (For a more detailed explanation, see Chapter 1, the section entitled "Variability Analysis.") Press the <ENTER> key to view the second page of this explanation (see following screen) and press 'B' to return to the first page.

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Grain Yield –t/ha

No.	Strategy Description		Mean	SD
1	SB:	APR-15	2.6237	0.6801
2	SB:	MAY-15	3.7790	0.3660
3	SB:	JUN-15	3.6113	0.3635
4	SB:	JUL-15	2.8580	0.4271
5	SB:	AUG-15	1.4430	0.4406
6	SB:	SEP-15	0.5557	0.2428

Explanation

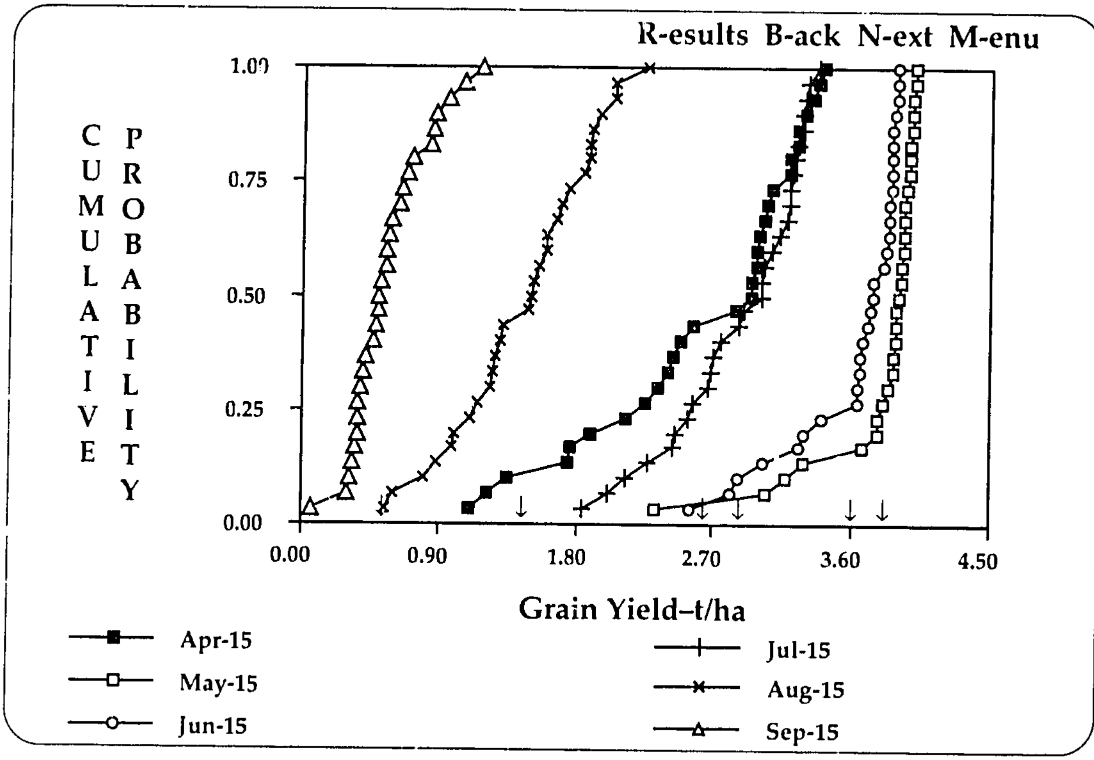
the probability range, A gives a better response, while over some other part of the probability range, B gives a better response.

At the end of this comparison procedure, the dominant strategies are listed by number. If there is more than one dominant strategy, then the choice of which is the 'best' strategy will depend on the individual. CPF plots are useful for making probability statements, such as, "There is a fifty-fifty chance of obtaining a yield less than X t/ha if a specified strategy is implemented on this soil."

B–ackward, S-kip or Press ↵ key

Dominant strategy or strategies: 2 3

NOTES: Mean values are shown by vertical arrows in all the plots.



Graphs

The plots of selected strategies are displayed by pressing the <ENTER> key after the second page of explanation or by typing 'S' (Skip) at the first page. Print the graph by pressing the <PrtSc> and <SHIFT> key simultaneously. Make sure your printer is turned on.

At the top of the plotted graphs are four key options. Typing 'R' results in a display of the "dominant" strategy or strategies at the bottom of the screen. Typing 'B' returns you to the previous screen. Typing 'N' or pressing the <ENTER> key displays the next screen. If there are no further screens or if you type 'M', the Strategy Analysis main menu screen will be displayed.

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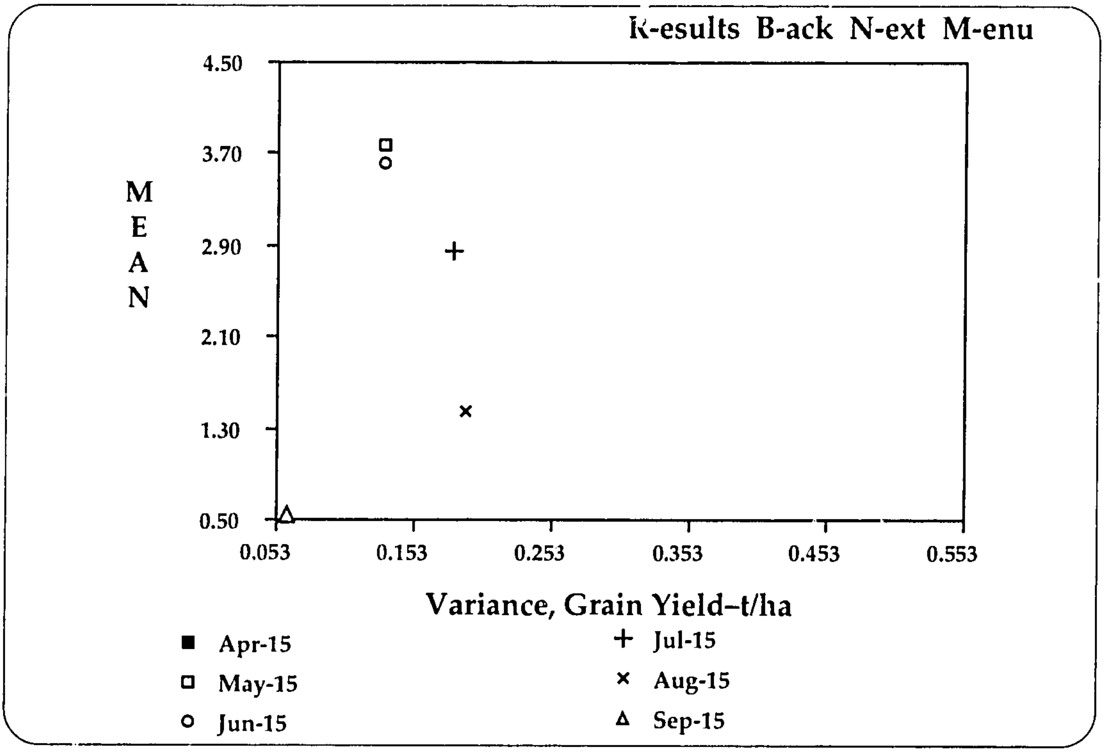

Type 'N' to see the mean-variance plot of the non-monetary variable, Grain Yield.

Press the <ENTER> key or type 'M' to return to the Strategy Analysis main menu.

VARIABLES AVAILABLE FOR ANALYSIS	No.	RUNS	STRATEGIES AVAILABLE
1. Net Return	1.	30	SB: APR-15
2. Sowing-Flowering Duration	2.	30	SB: MAY-15
3. Sowing-Maturity Duration	3.	30	SB: JUN-15
4. Total N-loss kg/ha	4.	30	SB: JUL-15
5. Nitrogen stress in vegetative stage	5.	30	SB: AUG-15
6. Nitrogen stress in reproductive stage	6.	30	SB: SEP-15
7. Total Nitrogen uptake kg/ha			
8. Number of Irrigations			
9. Cumulative Irrigation-mm			
10. Water stress in vegetative stage			
11. Water stress in reproductive stage			
12. Total Evapo-transpiration-mm			
13. Total Rainfall-mm			
14. Total Biomass-t/ha			
15. Grain Yield-t/ha			

Use PAGE UP or PAGE DOWN to see more SELECTIONS

Variability Analysis

1. Variable Analyzed ....Grain Yield-t/ha   4. ScreenType A
2. Strategies Analyzed 6   5. Scale/label N : N : N
3. Strategy Numbers ....1 2 3 4 5 6   6. Costs

Select items to specify strategy analysis inputs. Then type A,G or Q.
[A-Analyze strategies; G-Analyze and plot selected strategies; or Q-Quit] 1

FIRST-ORDER STOCHASTIC DOMINANCE (FSD)

You may select another variable for analysis at this point by typing '1' and entering a variable number. You may also continue variability analysis by choosing "Net Return" for a first-order stochastic dominance (FSD) analysis. For this example, we will run the FSD analysis. Type '1' and press the <ENTER> key. When you select this variable, an additional option, Option 6-Costs, appears in the bottom dialog window, and the dialog window heading changes from "Variability Analysis" to "Stochastic Dominance Analysis." Option 6 allows you to define costs associated with each strategy. Type '6' and press the , <ENTER> key. The following dialog window will appear. (For a more detailed explanation of FSD, see Chapter 1 of this User's Guide.)

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Dialog Window

1. Read costs from a file.
2. Define/View current costs
3. Return to previous menu

OPTION? 2

Options

Three options are available. If Option 1 is chosen, you will be prompted for a filename in which the costs for strategies have been saved. For a file to be available in which cost data has been saved, you must have, at some earlier date, entered cost values for strategies and saved them to a file (see the section entitled "Cost Values" in this chapter for instructions on how to save values). Choosing Option 2 allows you to view or enter/edit cost values. Option 3 returns you to the Strategy Analysis main menu.

For this example, type '2' and press the <ENTER> key.

Strategy No. 1

1. Market price/t 330.0
2. Base Production Cost/ha ...395.0
3. N-fertilizer Cost/kg 0.50
4. Cost/Fertilizer Appl. 5.00
5. Irrigation Costs/mm 0.50
6. Irri. Fixed Costs/ha ..100.00
7. Cost/Irrigation appl...12.50
8. Cost/1000 seeds 0.05

Select Cost Factor [or E-nd, N-ext, S-ame costs for remaining strategies]?

Cost Values*

A screen similar to the one above, listing the cost variables and their default values, will be shown for each available strategy.

1. You may change the default values by typing the number of the cost variable you wish to change and entering the new value. When you have entered all values for a strategy, type 'N' and press the <ENTER> key to view the cost values for the next strategy. Again, change any values you wish for the second strategy. Repeat this procedure until the cost values for all strategies have been viewed.

* The cost values listed in the above screen are from Hewitt (1988).

After the last strategy cost screen has been presented, type 'E' and press the <ENTER> key to save the values you have entered to a file. You will be prompted for a filename and then returned to the Strategy Analysis main menu. If you do not wish to save the cost values, type 'N' and press the <ENTER> key to return to the main menu.

2. Type 'E' and press the <ENTER> key at any time in this procedure to return to the Strategy Analysis main menu and/or when you wish to save the cost values to a file.

For this example, Type 'N' and press the <ENTER> key to review the costs for the six selected strategies. Type 'Y' or 'N' when prompted to save the values. The Strategy Analysis main menu will then be presented. For this example, the costs for each of the six strategies are the same as those shown in the cost screen above.

Net Return

No.	Strategy Description	Mean	SD
1	SB: APR-15	453.31	224.42
2	SB: MAY-15	834.57	120.78
3	SB: JUN-15	779.24	119.96
4	SB: JUL-15	530.64	140.94
5	SB: AUG-15	63.690	145.39
6	SB: SEP-15	-229.1	80.127

Explanation

FIRST ORDER STOCHASTIC DOMINANCE (FSD): This decision analysis procedure involves a comparison of the cumulative probability functions (CPF) of the strategies defined, in terms of net return. In such a comparison, one strategy will dominate another by FSD if the CPF lies to the right of another strategy over its entire range. Thus, if the CPFs for strategies A and B cross, once or many times, then neither is eliminated from the analysis, since in some years A gives a better response. No assumptions are made as to the risk attitudes of the user; it is simply assumed that the user would prefer more net revenue to less. At the end of this comparison procedure, the

B–ackward, S-kip or Press ↵ key

FSD strategy or strategies: 2 3
NOTE: Mean values are shown by vertical arrows in all the plots.

FSD Analysis
Press the <ENTER> key to view the analyzed strategies with mean and

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standard deviation (SD) for each. The strategy or strategies selected with FSD are identified by number at the bottom of the window. A generic explanation for FSD selection is given in the "Explanation" window on the right of the screen. Press the <ENTER> key to see the second page of this explanation (see following screen) and press 'B' to return to the first page. (For a more detailed explanation, see Chapter 1 in this User's Guide.)

Net Return

No.	Strategy Description	Mean	SD
1	SB: APR-15	453.31	224.42
2	SB: MAY-15	834.57	120.78
3	SB: JUN-15	779.24	119.96
4	SB: JUL-15	530.64	140.94
5	SB: AUG-15	63.690	145.39
6	SB: SEP-15	-229.1	80.127

Explanation

dominant strategies are listed by number. If there is more than one dominant strategy, then second-order stochastic dominance (SSD) is carried out. You may skip the SSD analysis if you wish.

B–ackward, S-kip or Press ↵ key

FSD strategy or strategies: 2 3

NOTE: Mean values are shown by vertical arrows in all the plots.

If FSD identifies one dominant strategy, then the "Cumulative Probability" and "Mean-Variance" plots follow this screen.

If no one strategy is dominant, press the <ENTER> key for SSD analysis. The "Cumulative Probability" and "Mean-Variance" plots will follow that analysis.

Net Return			
No.	Strategy Description	Mean	SD
1	SB: APR-15	453.31	224.42
2	SB: MAY-15	834.57	120.78
3	SB: JUN-15	779.24	119.96
4	SB: JUL-15	530.64	140.94
5	SB: AUG-15	63.690	145.39
6	SB: SEP-15	-229.1	80.127

Explanation

SECOND ORDER STOCHASTIC DOMINANCE (SSD): In addition to the assumption that the decision maker would prefer more net revenue to less, SSD assumes that he or she is averse to risk, to some unspecified degree. This is for most people a perfectly reasonable assumption. At the end of this comparison procedure, the dominant strategies are listed by number. If there is more than one dominant strategy, then choice of which is the 'best' strategy will depend on the individual and his attitude towards risk. For many applications, SSD will be sufficiently powerful to reduce the set of dominant strategies to one or two only.

B-ackward, S-kip or Press ↵ key

FSD Strategy or strategies: 2 3
SSD Strategy or strategies: 2 3
NOTE: Mean values are shown by vertical arrows in all the plots.

SECOND-ORDER STOCHASTIC DOMINANCE (SSD)

The two strategies with mean and standard deviation (SD) for each appear on the left side of the above screen. Both the FSD and SSD strategies selected are identified by number at the bottom of the window. A generic explanation for SSD selection is given in the "Explanation" window on the right of the screen. There is no graphical representation of SSD. (For a more detailed explanation of SSD, see Chapter 1 in this User's Guide.)

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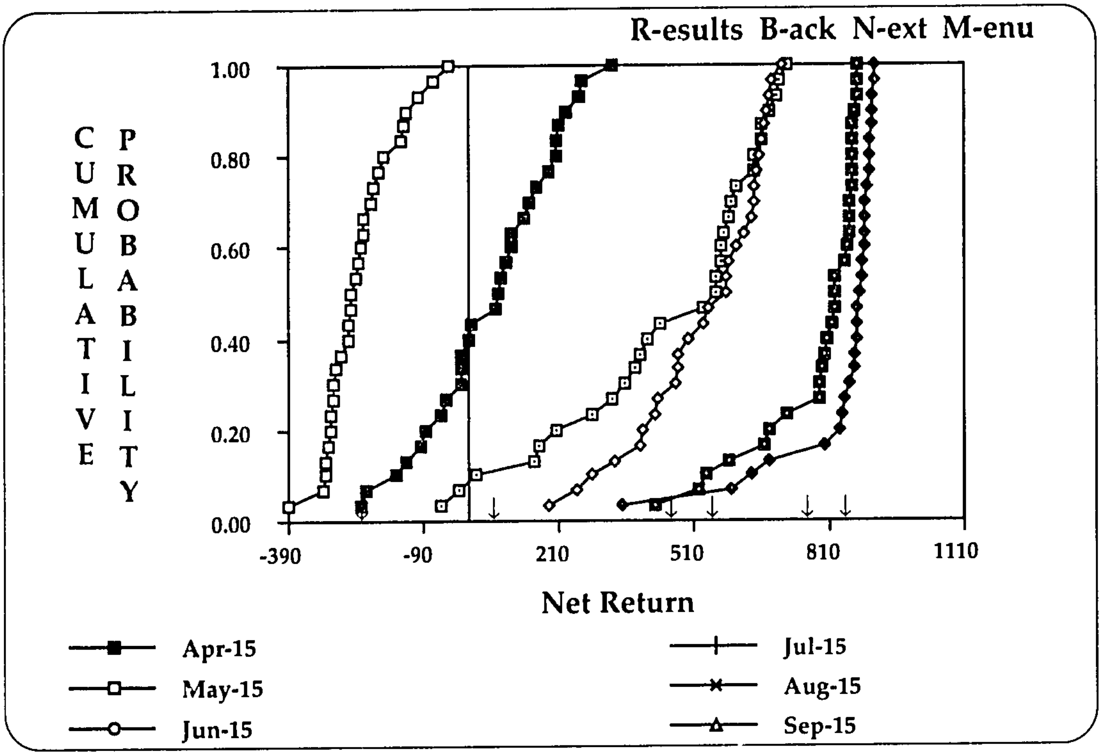
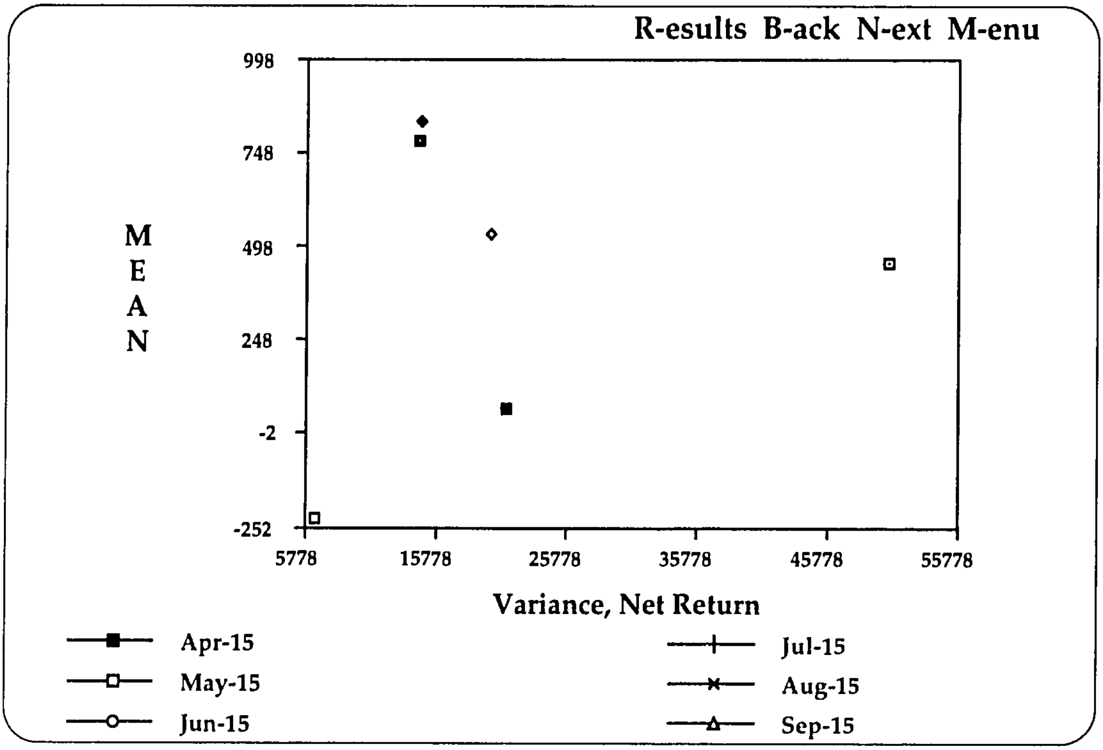


Graphs

To view the plot(s) of FSD strategies, press the <ENTER> key after the second page of FSD explanation or type 'S' (Skip) at the first page. A printout of the plots is made by pressing the <PrtSc> and <SHIFT> keys simultaneously. Make sure your printer is turned on.

Type 'N' or press the <ENTER> key to view the new screen. Type 'M' to return to the Strategy Analysis main menu screen.



This is the mean-variance plot of the monetary variable, Net Return. If more than one strategy is dominant, this plot can help the user to determine which strategy (or strategies) he prefers.

EXIT

This ends the example of the Strategy Evaluation Program. Many additional analyses on selected strategies may be done from the Strategy Analysis main menu.

If you would like to set up additional strategies for analysis, you will need to exit the program and return to the DSSAT main menu by pressing 'Q' while in the Strategy Analysis main menu and then selecting "S Strategy Evaluation."

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Chapter 6
PROBLEMS AND SOLUTIONS

Some of most common errors that may occur while using the Strategy Evaluation program and their solutions are listed below.

1. The program does not run on your machine, or part of it does not run, or you get a message saying "program too big to fit in the memory," or any similar messages.
Make sure your computer has 640K of RAM (Random Access Memory) memory. If you do and still get this error, check that you have at least 500 kilobytes of free memory available to load and run DSSAT and this program. If you use memory-resident programs, or are part of a network, you will need to remove them from memory.

2. The status message "Incomplete" is given for strategy simulations instead of "Successful."
If all simulations for a strategy are completed successfully, then the strategy status will be listed as "Successful." However, if one or more simulations could not be completed, then the above message occurs. The reason for this may be either an error in the strategy setup, or in the crop model, or you may not be using the version of the model supplied with the DSSAT release version 2.1. Check your strategy setup first to see that all selections are correct and rerun simulations if necessary (refer to Chapter 3). If no error in strategy setup can be found and the model version is correct, please contact IBSNAT.

3. When ready to graph the results, you get an error message.
First make sure you have a graphics board installed in your computer. If there is one installed, then check first that the screen type option, which specifies the type of graphics board in your computer, is defined correctly (refer to Chapter 6), and second, that the DSSAT Graphics program is version 2.1.

4. "Input runtime module path" error.
The program is looking for a file called BRUN40.EXE. This file was supplied to you with the Strategy Evaluation programs. Make sure that you have it and have specified a path to the directory/disk containing this file using the DOS comment PATH. Refer to your DOS Manual concerning the usage of the PATH command.

5. When you start the analysis, the screen displays a different number of simulations other than those chosen.
Check that the crop model you are using is the DSSAT version 2.1.

6. You are unable to print the graph using the "Print Screen" command.
To print a graphic screen using an IBM-compatible printer, you must install the graphic (screen print) program into your computer. The screen print program for the MS-DOS system is titled GRAPHICS.COM on the system disk. An enhanced version of the print program may also have been provided with your graphic display adapter. Refer to your MS-DOS manual or graphic adapter for further information. Once the screen print program is loaded and the desired screen is displayed, press the <PrtSc> key (on some keyboards, you must press the <SHIFT> key at the same time) to print the graph.

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Appendix
INPUT FILE STRUCTURES

Strategy analysis requires 3 input files. They are 1) the output file (OUT5.XX) created by the crop models, 2) the GLABEL4.DAT file, and 3) the COST.DAT file. The crop model output file contains the name of the crop, the strategies simulated, and data for the variables listed in file GLABEL4.DAT. The names GLABEL4.DAT and COST.DAT are reserved names and the GLABEL4.DAT file must be present in the data directory of each crop model. The GLABEL4.DAT file contains names, sequence numbers, and selection criteria (i.e. whether maximum, or minimum value is to be selected) of the variables stored in OUT5.XX The COST.DAT file contains costs of various farm operations and expenses for each strategy.

OUT5.XX FILE

The first two lines of OUT5.XX give crop and variables simulated. Each subsequent line contains the crop code, output data for each simulated year, and strategy name.

GLABEL4.DAT FILE

All the inputs in this file are in free format; that is, there needs to be one or more blank spaces between any two input values. A description of each input variable follows.

Variables in Line 1:

NV	Number of variables saved in FILE5 or available for analysis.
NECVAR(1)	Sequence number for variable, grain yield/ha.
NECVAR(2)	Sequence number for variable, number of irrigations.
NECVAR(3)	Sequence number for variable, amount of irrigation.

Line 2:
This line contains the selection criteria code (-1, +1) for each of the NV variables, where "-1" means select strategy that has minimum value and "+1" means select strategy that has maximum value.

All other lines:
Each NV variable is described on a separate line. These descriptions must lie within columns 4-43.

COST.DAT FILE

This is an optional file which contains data for cost analysis. This is also a free format input file. The first line of the file shows the number of strategies for which cost data is available. Each subsequent line contains data for one strategy in a predefined order.

Order of data:
Market Price/t
Base production cost/ha
N-Fertilizer Cost/kg
Irrigation Cost/mm of water
Fixed cost of irrigation equipment/ha
Cost/Irrigation Application
Cost/Fertilizer Application
Cost/1000 seeds

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