

**Technical and Functional Documentation of an interface for Expert-Users
of the SIWARE system**

Version 1.2

The 'Reuse of Drainage Water Project' is a joint activity of the technical agencies:

Drainage Research Institute (DRI), Delta Barrages, Egypt, and
DLO Winand Staring Centre (SC-DLO), Wageningen, the Netherlands.

The project is funded by the Ministry of Public Works and Water Resources of Egypt and by the Ministry of Foreign Affairs of the Netherlands in the framework of the joint programme of Technical Cooperation between Egypt and the Netherlands.

During the first phase of the project the Advisory Panel for Land Drainage has acted as a Steering Committee. During the last phase a separate Steering Committee has been appointed consisting of:

D.E. El Quosy	(Drainage Research Institute)
E.H. Imam	(Cairo University)
M.Q. Nadar	(Ministry of Public Works and Water Resources)
P.E. Rijtema	(DLO Winand Staring Centre)
J.W. Wesseling	(Delft Hydraulic Laboratory)

The results of studies as carried out in the 'Reuse of Drainage Water Project' have been presented in preliminary reports and in a final report. As such the contents of the preliminary reports can vary strongly, from a simple presentation of data to a discussion of research results with tentative conclusions.

All opinions, conclusions and recommendations in the reports are those of the cooperating Institutes, and not of the Ministry of Public Works and Water Resources of Egypt, or the Ministry of Foreign Affairs of the Netherlands.

REUSE OF DRAINAGE WATER PROJECT

**Technical and Functional Documentation
of an interface for Expert-Users
of the SIWARE system**

Version 1.2

**Rob Lokers
Klaas Oostindie
Piet de Visser**

Q-Ray and DLO Winand Staring Centre

REUSE REPORT 41

Wageningen, 1995

2006/09

© 1995

DRAINAGE RESEARCH INSTITUTE

P.O. Box 13621/5, Qanater, Cairo, Egypt

Tel.: +20 2 959383; telefax: +20 2 959153; telex: 20275 WRC-UN

THE DLO WINAND STARING CENTRE, Institute for Integrated Land, Soil and Water Research

P.O. Box 125, 6700 AC Wageningen, The Netherlands

Tel.: +31 8370 74200; telefax: +31 8370 24812; telex: 75230 VISI-NL

All rights reserved. No part of this publication may be reproduced or published in any form or by any means, nor transmitted, nor translated, nor stored in a data-base or retrieval system without the written permission of the Drainage Research Institute and the DLO Winand Staring Centre.

Project nr. 8576

Doc. code: 9444ak01.dwp

RR41.BS

CONTENTS

1. Introduction	1
2. Description of the system and its limitations	3
2.1 General description of the system and its functionality	3
2.2 Choices and limitations	4
3. Description of the screen-layout and functionality	7
3.1 The main program window and its elements	7
The word-processor metaphor	9
Opening files	10
Editing files	11
3.2 An example of editing data in a grid (PERIOD.TXT)	15
3.3 An example of a popup-edit screen (MARKAZ.nn)	16
3.4 An example of checkboxes (REUSE.SEL)	17
3.5 A special screen : the file check window	18
3.6 Context sensitive help through the standard MS_Windows help facility	18
3.7 Descriptions of edit screens per file	20
4. Technical structure	21
4.1 General program structure	21
4.3 MDI structure	23
4.4 Form structure	24
4.5 Distribution and installation	26
4.6 Use of different data sets	26
4.8 Networks and Multi user usage	28
4.9 Hard- and software requirement	28
5. File descriptions and auxiliary programs	29
5.1 File descriptions	29
5.2 Auxiliary programs	29

Appendix A : File descriptions

Appendix B : Screen descriptions

Appendix C : Description of all modules and forms in SIWARE

Appendix D : Cross reference call matrices for SIWARE source files

Appendix E : ORWC matrices for SIWARE source files

Appendix F : Programming standards for Visual Basic (concept)

Appendix C, D, E and F are not included in this report.

1. Introduction

This document contains the technical and functional documentation for a system that can serve as an interface for engineers using the SIWARE model package. The system described by this document will be referred to as the designer-interface.

For a detailed description of the SIWARE system we refer to "Reuse Report number 40" by Drainage Research Institute (DRI) and DLO Winand Staring Centre (SC-DLO).

This document deals with the development of an interface for expert-users of SIWARE. These users must be able to enter data on the dimensions and functioning of an irrigation and drainage system, as well as hydraulic and crop properties of the relevant areas. These data are the input for the SIWARE models.

The initiative to develop a designer-interface is the result of problems encountered by the DRI engineers and remarks from Prof. Dr. Ir. W.H. van der Molen. Data entry for complex models such as SIWARE through text editors and spreadsheets is a tedious procedure and liable to errors. These shortcomings were especially felt at DRI when new engineers were designated to start working with the SIWARE model. New users appeared to require some 3 months of learning time, in addition to the precious time of senior DRI experts for guidance, before they could run the model independently. Using a well designed, special purpose user interface gives more control on file format and constraints during editing of data and will result in correct data files.

In further parts of this documents you will find:

- an overall description of the program, its goals and its limitations;
- an impression of the screens that the user will work with;
- a brief description of the proposed programming conventions, included to ensure consistency between different parts of the program and to encourage/enforce re-use of solutions and code. An appendix will contain the more elaborate programming standards;
- technical constraints for the system, including hard- and software platforms and exact descriptions of interface files and auxiliary programs.
- Appendices with File descriptions (A), screen descriptions (B), a shortlist with all modules and forms (C), cross reference tables of all modules and forms (D), ORWC matrices for each module and form (E) and programming standards used during development of the system (F).

Users and engineers can limit themselves to reading only the chapters 1, 2 and 3. Designers and programmers are advised to read the entire document. Since some specific MS-Windows and VB terms are used without further explanation, a certain familiarity with the MS-Windows environment and with Visual Basic is assumed.

It should be noted that this version of the technical documentation was preceded by a pilot project in which only the general layout of the application, the framework, and the interfaces for three of the total of twenty eight input files were described.

The current document contains the documentation for a more complete system, encompassing 24 from a total of 28 required input files. See chapter 2.1 for details on the files which are not included in the interface.

Some input files for the SIWARE models have variable file names. These files are referred to as e.g. HDext4.TXT, where ext4 stands for a variable string of 1 to 3 characters.

These variable strings define the specific runs of the SIWARE model and can be considered as a rudimentary (already existing) form of a file management system.

2. Description of the system and its limitations

The first paragraph of this chapter states the objective of this project. In the second paragraph some of the assumptions and constraints are explained.

2.1 General description of the system and its functionality

The overall objective was to make a user interface that can handle the input to the SIWARE models and programs.

This resulted in a system that can be used to enter and maintain data concerning the design and management of the irrigation and drainage system in semi-arid areas. The data must be checked on entry whenever possible, to prevent inconsistencies and resulting errors when using the programs. The system will be used by experts from DRI and DLO Winand Staring Centre.

The purpose of the designer-interface is to replace the use of text-editors on ascii-files. This will have the following advantages:

- less errors when entering data;
- faster training of new engineers;
- ease of use.

The position of the interface with regard to the other SIWARE components is described in figure 1.

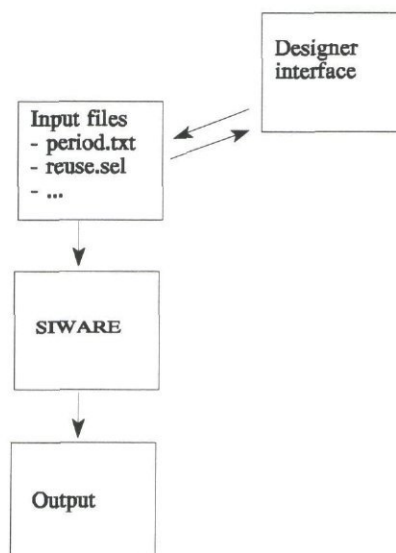


Figure 1: The relation between the designers interface and other SIWARE components

An earlier pilot system was constructed, treating only three input files. The current system is designed using the knowledge and experience gained with this pilot project. For a technical and functional description of this pilot project, refer to :

'System documentation of an interface for Expert-Users of the SIWARE system', Q-Ray and SC-DLO, doc. code 9417se01.dwp.

The resulting system and the documentation will be used by water management experts.

2.2 Choices and limitations

The following choices have been made:

- The designer-interface system will only run on the MS-WINDOWS platform. This should not pose a problem since files are portable between platforms (refer to the porting document).
- The interface is designed according to current MS-Windows standards and conventions. Recommended: The Window Interface; An application Design Guide - Microsoft Corporation, Microsoft Press, Redmond, WA; ISBN 155615-439-9 (1987, 1992).
- The tool selected for building the designer-interface system will be built, is Visual Basic version 3.0. This tool is suitable for form-like data-entry, offers good dialogue capabilities and is capable of reading and writing the files in the formats requested by SIWARE (both sequential and direct-access). In order to facilitate the data-entry, one add-on is used: the Spread/VBX tool from Farpoint Technologies.

The interface is designed in such a way that extension with other data-entry screens can easily be implemented. This is important since models may be extended and may need additional data files, which also need to be edited by the user interface.

The following files were deliberately not (yet) included in this interface design document for reasons of time/budget limitations, and because they are all relatively small and need to be created only once.:

CRPNME.TXT
INIRS.TXT
PETreg.TXT
REGION.TXT
SALRIC.TXT

Also a number of definition files are not included. They define markazes, crops, pumps and soil names. Without these files the SIWARE Users' Interface can not be run. These data are required by the user interface but can not be adapted by the user interface. Instead, they should be created (only once) before running the interface. Validity of data in these files is the user's responsibility. The files are :

MARKAZ.DEF
CROP.DEF
PUMP.DEF
SOILNAME.DEF

These DEF-files are needed to construct the screens of several files.

CROP.DEF contains crop definitions and crop specific data. It is the basis of the screens of files MARKAZ.nn, CRDVcr.TXT, CRPCHR.TXT and CROPDUT.TXT.

MARKAZ.DEF contains a list with markaz names and numbers and their location in the study area. It is the basis of the screens of files MARKAZ.nn and MARKAZ.Rnn.

PUMP.DEF contains the definitions of pump-stations for all regions. It is the basis of the screen of file INTIPU.ext4.

SOILNAME.DEF contains the soil names and the corresponding soil numbers used in SIWARE. It is the base of the screen of file SOILS.TXT.

The existing programs CHECKER, CROPPAT and NEWTESTC already perform part of the data-integrity checks. These programs can be executed directly from the user interface. Therefore, for some files not all constraints are checked by the check options in the user interface. These files are the following:

- CNSYST.ext4
- GRWUSE.DAT
- HDext2.TXT
- NAGRUS.ext4
- SECTION.ext1

3. Description of the screen-layout and functionality

In this chapter, the system will be described from the users point of view. First, a general description of the system and its components will be given. In the following paragraphs, some of the data-entry-screens will be discussed and explained.

3.1 The main program window and its elements

The program has been constructed with one main window, the so-called MDI window (MDI = Multiple Document Interface). All editing of SIWARE files takes place inside this main window. This window is shown in figure 2.

The window has a *menu* which enables the user to access functions of the program (opening files, setting program options, starting auxiliary programs etc.).

Some of the often used options are also accessible through the *button bar* (the grey bar, situated just below the menu). The buttons enable for example opening and saving of files. When a certain function is not applicable to the data in the window, the button will be deactivated (indicated by a lighter appearance). Deactivated buttons do not react to mouse movements or clicks. The buttons are also sensitive to mouse movements; when the mouse is moved over a button, a short hint about the function of the button appears in the message-box located in the *status-bar* at the bottom of the screen. This status bar contains several sub-items: a message-box, key-status indicators and a clock.

Both the status-bar and the button bar can be turned on/off via the options menu.

Finally, the main window contains a so called *context window* (sometimes called a toolbox) which can be used to access the different file-editing functions. Note that taking a context window as a way to start up the editing windows was a design decision and is not standard MS-Windows.

The context window contains buttons to activate the different edit-screens of the program. The buttons are ordered alphabetically and identified with the name of the (default) file to edit.

This context window can be activated from almost anywhere in the program by pressing the "Main Menu" button on the toolbar.

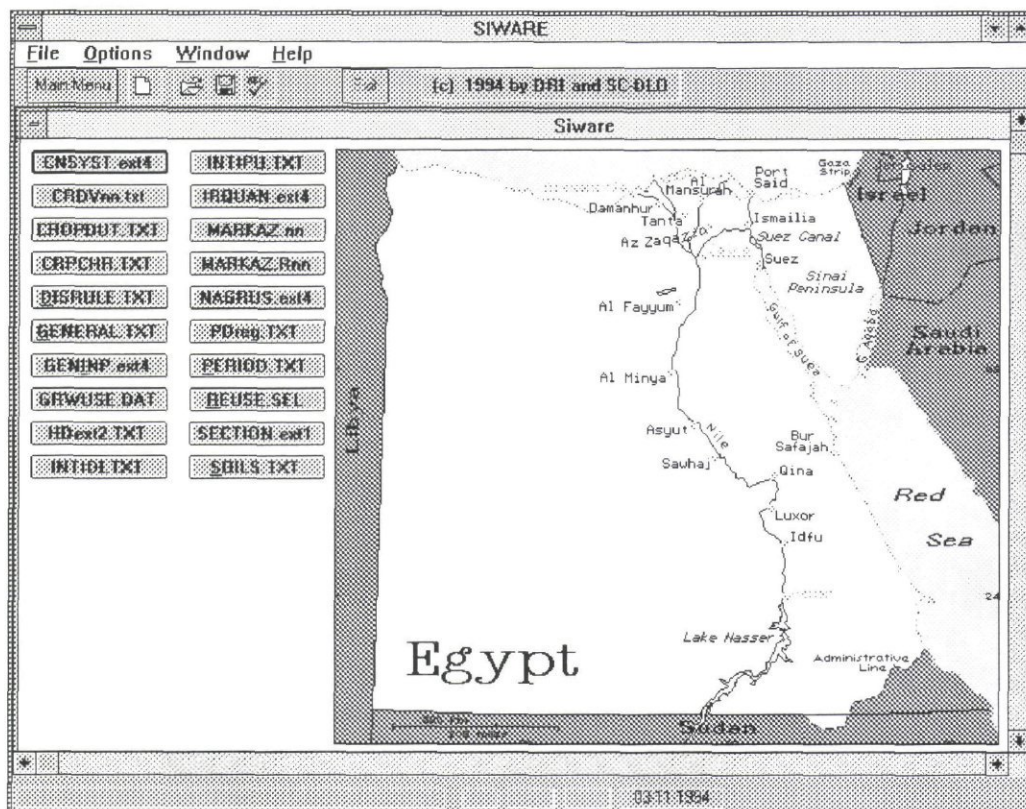


Figure 2: Main window

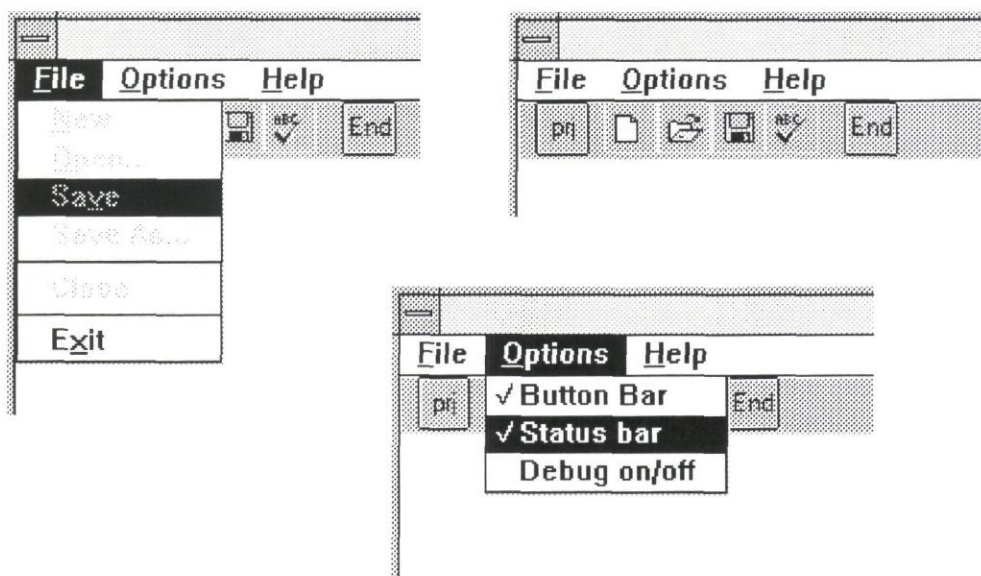


Figure 3: Example of menu and buttonbar functionality

The menu of the main window contains the following menu options (shaded options can not yet be selected, but will be available when data-files are being edited):

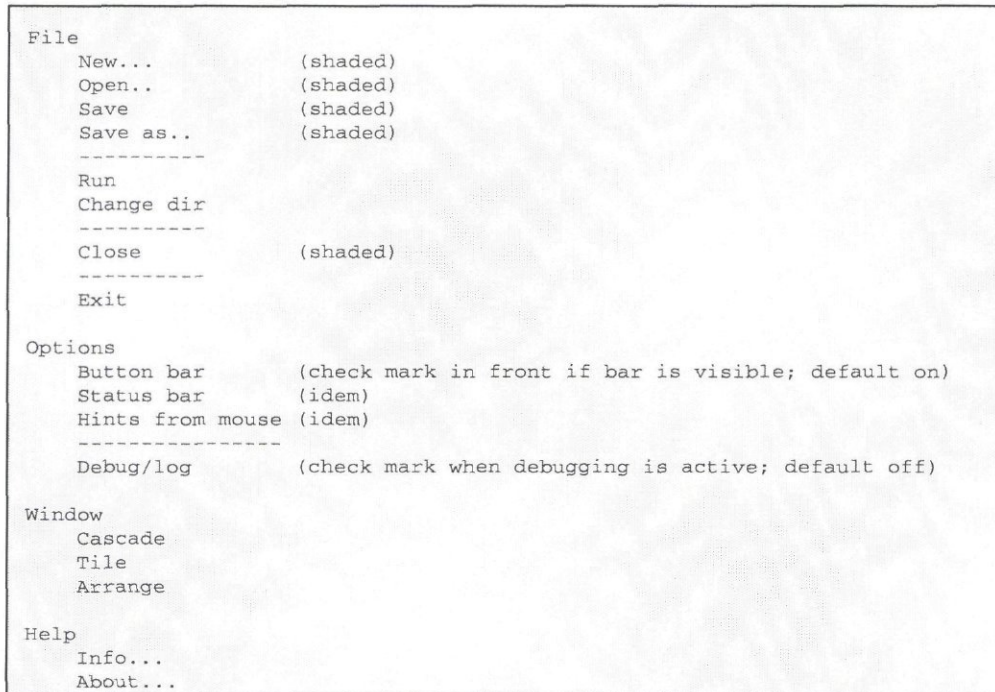


Figure 4: Example of the menu-options available when the context-window is active.

The word-processor metaphor

The program is constructed to read, edit and save files, therefore, it is comparable to a word-processor.

This analogy is applicable to the following functional aspects of the interface:

- some menu-options will be similar to a (windows) editor program (New/Open/Save);
- the user is allowed to open more than one file or window at a time;
- changes on the screen are not automatically saved to disk. The user must do this by choosing "Save" or confirming a "Save" operation when closing a window or program.

The analogy to a word processor is limited in the following ways:

- only one file of a particular type can be opened;
- each edit-screen can only read/write/edit files in conformity with its own particular layout, ensuring correct input data for SIWARE;
- cut/copy/paste operations have been disabled in this program. In some screens, however, an "Edit" menu is foreseen with option to delete, insert or duplicate data-items.

Opening files

When an option is chosen from the context window, the corresponding edit-screen is opened. In some cases a (default) file can be opened. We distinguish the following cases:

- *Fixed name:*

SIWARE requires a file with a specific name (e.g. REUSE.SEL). In this case the program attempts to open the file with this name and read its data in the edit screen. If the file cannot be found, the user is presented with a list of similar filenames (e.g. REUSE.*) to choose a file (see: range of names).

- *Range of names:*

SIWARE requires one or more files with a pre-defined type of name (e.g. GENINP.ext4, where ext4 = strategy number). In this case, the program presents the user with a list of available files in the current directory. If the user does not choose a file, and cancels the operation, he/she is presented with a message box: "Really cancel?". With option 'yes' the interface returns to the main menu. Option 'no' opens an empty file. The user can then enter new data (see: New).

- *New file:*

In some cases, it was decided that the system should not open a file or prompt the user for a file (e.g. PERIOD.TXT). In this case, the user is presented with an empty screen, which might contain some default values. For the user, this situation is identical to choosing "New" from the menu of any edit screen.

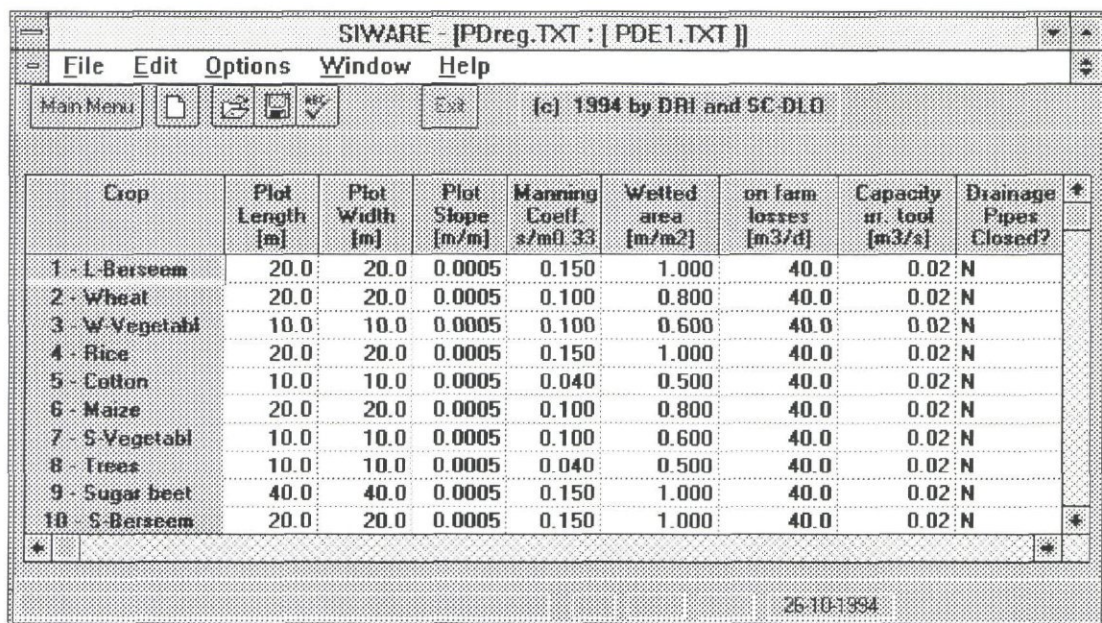
The user has a choice to enter new data from scratch, or to open an existing file and alter the data in it, possibly saving it under an other name (Save As...).

Editing files

To alter the contents of a file, there are four basic approaches:

1) Editable grid:

For tabular data, the user is presented with a so called grid (figure 5). Each of the cells in the grid contains a data-item. The user can move through the data using the arrows. The "current cell" of a grid will be highlighted with a box around it, and generally the current line will have a different colour than the other lines in the grid. Editing of the data takes place by typing the data directly into the "current cell"



Crop	Plot Length [m]	Plot Width [m]	Plot Slope [m/m]	Manning Coeff. s/m0.33	Wetted area [m/m2]	on farm losses [m3/d]	Capacity in. tool [m3/s]	Drainage Pipes Closed?
1 - L-Berseem	20.0	20.0	0.0005	0.150	1.000	40.0	0.02	N
2 - Wheat	20.0	20.0	0.0005	0.100	0.800	40.0	0.02	N
3 - W-Vegetabl	10.0	10.0	0.0005	0.100	0.600	40.0	0.02	N
4 - Rice	20.0	20.0	0.0005	0.150	1.000	40.0	0.02	N
5 - Cotton	10.0	10.0	0.0005	0.040	0.500	40.0	0.02	N
6 - Maize	20.0	20.0	0.0005	0.100	0.800	40.0	0.02	N
7 - S-Vegetabl	10.0	10.0	0.0005	0.100	0.600	40.0	0.02	N
8 - Trees	10.0	10.0	0.0005	0.040	0.500	40.0	0.02	N
9 - Sugar beet	40.0	40.0	0.0005	0.150	1.000	40.0	0.02	N
10 - S-Berseem	20.0	20.0	0.0005	0.150	1.000	40.0	0.02	N

Figure 5: Editable grid

2) Grid with editable pop-up:

When the amount of data in a file is considered too large or too complex to be edited in a grid, the data is only presented in a grid, but editing is not allowed. To alter the data, the user must select an item by moving to a row in the grid and select that item to edit by pressing <Enter> or double clicking with the mouse.

Altering the data takes place in a popup-window in the same way as editing in an editable grid. Changes are stored in the main grid when the user confirms them by pressing "Ok".

Examples of a grid with an editable popup are shown in figure 6 and 7.

SIWARE - [Soil characteristics : [SOILS.TXT]]						
File Edit Options Window Help						
Main Menu						[c] 1994 by DRI and SC-DLO
soil name	soil code	minimum dry bulk density [kg/m3]	m.c. at saturation [m3/m3]	m.c. at field capacity [m3/m3]	m.c. at wilting point [m3/m3]	slope of func (dr.db., m. [kg/m3]
basin clay	1	1000	0.540	0.519	0.321	-20
silty clay	2	1000	0.507	0.463	0.257	-15
silty clay loam	3	1200	0.475	0.372	0.185	-5
clay loam	4	1200	0.445	0.406	0.242	-9
sandy clay loam	5	1400	0.432	0.290	0.140	-5
loam	6	1300	0.503	0.420	0.098	-1
silt loam	7	1300	0.509	0.461	0.092	
sandy loam	8	1300	0.465	0.260	0.061	
loamy fine sand	9	1300	0.439	0.179	0.060	
medium fine sand	10	1400	0.350	0.155	0.023	
26-10-1994						

Figure 6: Grid with editable pop-up

Edit Soil Characteristics	
File Edit Options Help	
Soil : silty clay	
soil code	2
minimum dry bulk density [kg/m3]	1000
m.c. at saturation [m3/m3]	0.507
m.c. at field capacity [m3/m3]	0.463
m.c. at wilting point [m3/m3]	0.257
slope of func (dr.db., m.c.) [kg/m3]	-1500
a1 in max. capillary flux funct [-]	0.000950
a2 in max. capillary flux funct [-]	0.004060
a3 in max. capillary flux funct [-]	0.013800
b1 in max. capillary flux funct [-]	0.392000
b2 in max. capillary flux funct [-]	1.700000
b3 in max. capillary flux funct [-]	4.290000
thickness cap. layer bel. rootz [m]	0.500
[vertical] permeability [m/d]	0.075
diffusivity [cm2/d]	6.00
<input type="button" value="Ok"/> <input type="button" value="Cancel"/>	

Figure 7: Editable pop-up

3) Edit fields:

For a limited number of data, or for data of various nature, the user is presented with a list of so called text-boxes in which he can enter data (Example: GENINP.ext4, see figure 8).

The screenshot shows a window titled "SIWARE - [GENINP.Ext4 : [GENINP.87]]" with a menu bar (File, Edit, Options, Window, Help) and a toolbar. Below the toolbar, there is a section labeled "max. capacity additional irrigation tools [m3/s]". This section contains a table with the following data:

OPRLOSS	factor to account for operational losses [-]	1.000
SIDESLP	side-slope of irrigation canals [m/m]	1.000
QMAXSAK	max. capacity major irrigation tools [m3/s]	0.025
QMAXPUM	max. capacity additional irrigation tools [m3/s]	0.050
FRACSAK		0.800
FRACPUM		0.200

At the bottom right of the window, the date "03-11-1994" is displayed.

Figure 8: Screen with text-boxes

4) Check/option boxes:

For simple on/off options, the user is presented with so called check-boxes or option boxes. An example of this is the edit screen for REUSE.SEL (see figure 9 and description in next paragraph).

Most of the edit screens fit into one of the above classes, however, some screens are a mixture of two or more classes. An example of this is the screen to edit IRQUAN.ext4, where textboxes, option buttons and a grid are used to edit different data-items in the file (figure 10).

The following paragraphs will describe some of the edit windows in detail, explaining the user-options for each window.

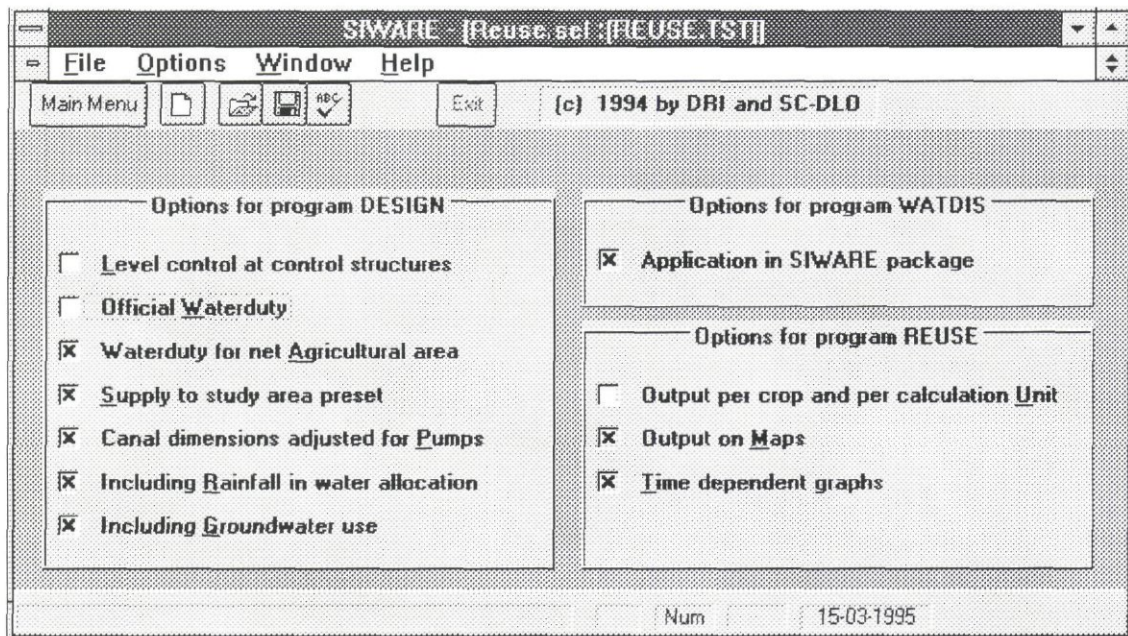


Figure 9: Screen with check/option boxes

SIWARE - [IROUAN.Ex44 : [IROUAN.DD]]

File Edit Options Window Help

Main Menu [Icons] Exit (c) 1994 by DRI and SC-DLO

Total Water Quantity : [10E6 m3] 2500.000

Average Chloride Conc. : [Meq/l] 1.20

Number of timesteps :

1 Year ☐

12 Months ☐

36 Decades ☒

Update

Edit Fractions

Decade #	Fraction	10E6 (m3)
1	0.021	53
2	0.025	63
3	0.005	13
4	0.005	13
5	0.026	65
6	0.018	45
7	0.025	63
8	0.022	55
9	0.025	63
10	0.027	67
11	0.027	67
12	0.025	63

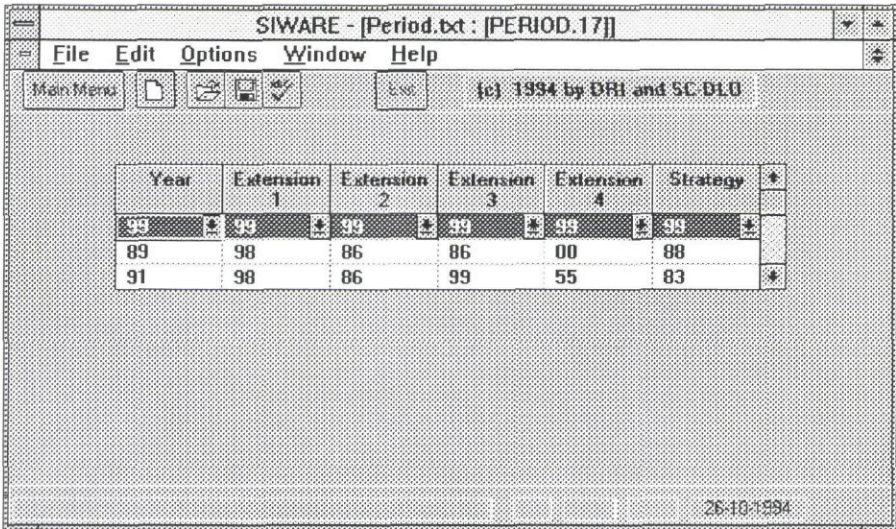
Num 28-02-1995

Figure 10: Screen with several edit options

3.2 An example of editing data in a grid (PERIOD.TXT)

The file PERIOD.TXT contains six columns and an undetermined number of lines. The editing screen for this file will reflect this structure (figure 11).

The file contents will be displayed in a *grid*. The current line will be marked (default: blue). Editing can take place directly into the "current cell". Some of the fields can also be filled using a *drop-down list box* which contains the valid entries for the box (e.g. all extensions for which required files are present).



Year	Extension 1	Extension 2	Extension 3	Extension 4	Strategy
89	98	86	86	00	88
91	98	86	99	55	83

Figure 11: Screen to edit period.txt (Grid with extensions)

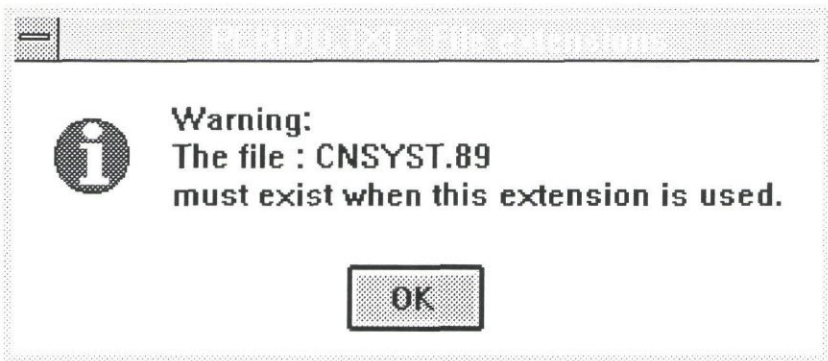






Figure 12: Period.txt with a warning

3.3 An example of a popup-edit screen (MARKAZ.nn)

The cropping pattern per markaz must be entered by storing the area (in Feddan, roughly equivalent to acres) per crop per markaz (figure 13). The file has the layout of a cross-table and it is viewed accordingly (this is what the current users expect to see).

The data per markaz consists of some 40 (forty) numbers, displayed horizontally in a grid. Since screens can only show a limited part of this table, editing directly into the grid is not advisable.

A solution is found by using a so called *popup-window* which enables the user to work on the areas of one markaz at the time. The popup-window appears when the grid is double-clicked or <Enter> is pressed and will contain a vertical listing with all the crops and their area for the selected markaz (figure 14).

SIWARE - [Crop pattern : [MARKAZ.00]]									
File Edit Options Window Help									
Main Menu					Exit	(c) 1994 by DRI and SC-DLD			
Comment :									
Markaz Name	Reg	Nr	Tot. area	L-Berseem	S-Berseem	Wheat	W-Vegetabl	Sugar beet	S-Veg
				1	2	3	4	5	
				Winter	Winter	Winter	Winter	Winter	Early
1st Mkrz	E	3	1000	100	100	0	50	0	
2nd Mkrz	E	2	0	0	0	0	0	0	
1st M Mkrz	M	1	1000	0	100	100	0	50	
2nd M Mkrz	M	2	0	0	0	0	0	0	
45th Mkrz	W	45	0	0	0	0	0	0	

Crop	(type)	Area
E-Berseem	(Winter)	100
S-Berseem	(Winter)	100
Wheat	(Winter)	0
W-Vegetabl	(Winter)	50
Sugar beet	(Winter)	0
S-Vegetabl	(Early_summ)	0
Rice	(Summer)	150
Cotton	(Summer)	0
Maize	(Summer)	150
Nat Vegt	(Nile)	0
Trees	(Perennial)	800
Sprinkler	(Perennial)	0
Surface	(Perennial)	0
W-Fallow	(Winter)	0
S-Fallow	(Summer)	0
Full	(Winter)	0
Barley	(Winter)	0

Figure 14: Screen with pop-window to edit data for one markaz

When this popup screen is activated, the cursor is placed on the same crop-area where the cursor was positioned at the moment of activating the popup.

In the popup, areas can be typed directly into the grid.

The range constraints are checked mainly when moving from one cell to another, The totals for crop types are checked when committing the data (Ok button).

3.4 An example of checkboxes (REUSE.SEL)

The main model options which are stored in REUSE.SEL can be changed by a screen that contains only so called *check-boxes* (see figure 9 in previous paragraph).

A check box can be turned on/off by clicking on it with the mouse, or by using a *shortcut-key*. Shortcut keys are indicated by an underlined character in the checkbox text. <Alt>-character changes the state of the button from on to off or vice versa.

When the mouse is moved over the different elements of the screen, a brief explanation text appears in the message-box (that is, if the status bar is visible).

3.5 A special screen : the file check window

The file check window is a window that checks the availability of the files that are needed to run the SIWARE models. It is generated when the data in the PERIOD.TXT edit screen are checked. Each time this check is performed, a list is generated containing all files needed to run. The files already available in the current working directory are checked in a checkbox in the "auto" column. The list also has the option to check the files manually in the "manual" column. (figure 15)

Note : Only the presence of the files is checked, which does not necessarily mean that the files are correct!

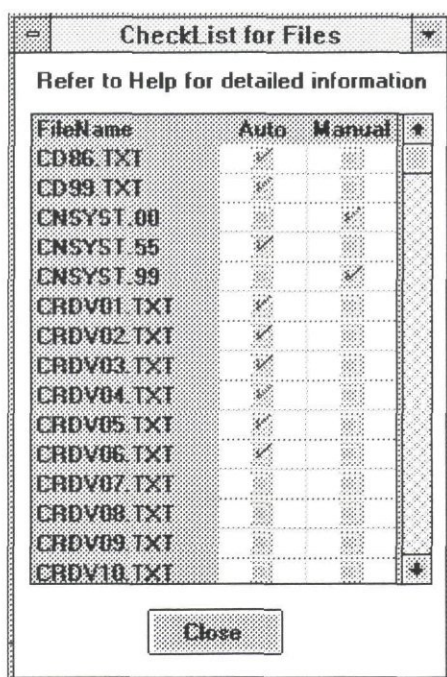


Figure 15 : Checklist for files

3.6 Context sensitive help through the standard MS_Windows help facility

The SIWARE user interface has a context sensitive help utility which uses the standard Windows Help facility. The help utility can be invoked by pressing the <F1> key on relevant controls (usually edit fields) or by using the general Help menu (figure 16). In a lot of cases a new help item can be invoked from a help screen. In this case these items are displayed green and underlined (figure 17) and double clicking with the left mouse button invokes the help screen for that item.

Usually an edit window has a general help item providing help information about the file (the first item in the menu) and help items for every separate input field (invoked by <F1> and by the next items in the help menu).

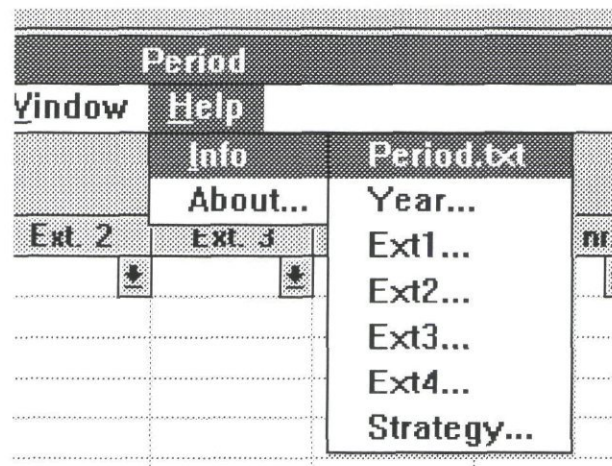


Figure 16: Help menu

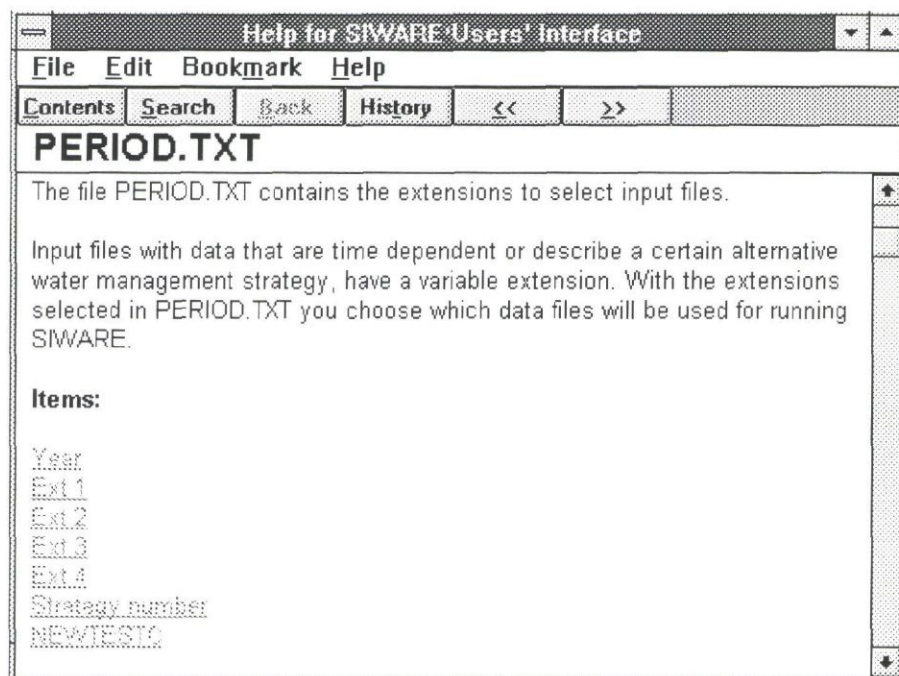


Figure 17: Help screen

3.7 Descriptions of edit screens per file

Appendix B contains the descriptions for each of the designed screens. It includes a screen-impression, a brief description of the screens behaviour and list of the relevant options available to the user.

4. Technical structure

This chapter describes the internal structure of the system. It assumes some familiarity with Windows-concepts and Visual Basic (VB).

First, the general principles of the program structure will be explained, followed by a brief listing of typical functions that are available in the different parts of the program.

Appendix C to F provide more details as to the workings of functions and the objects they operate on (Sourcefile object and function descriptions, Sourcefile-function cross reference and CRUD matrices).

When program functionality is discussed, it will be mentioned explicitly, to avoid confusion between code-functions (e.g. `Open_File(REUSE.SEL)`) and program functionality (e.g. editing of `REUSE.SEL`). Whenever this chapter mentions a "function", it refers to a particular piece of code. In VB, this can mean a proper function (a subroutine returning a value) or a normal subroutine (not returning a value). VB distinguishes correctly between the two.

4.1 General program structure

The program consists of forms (windows) and modules (groups of subroutines and functions). Essentially the program offers the possibility to open a separate form as an editing window for every file included in the SIWARE user interface. These forms can be opened from the corresponding button in the context window.

A Form is a window that performs a certain program functionality. All forms are given a certain standardized behaviour and are only equipped with functions to perform actions that affect the form itself or its data. The functions contained in a form are accessible from within that form only (private functions).

The forms also contain a number of constants that affect the form (its default/min/max sizes, the default files it should read, the read/write format).

Modules contain groups of (global, public) functions that are of use to more than one part of the program (e.g. `Function FileExists(sFname As String) As Boolean`). The functions in a module do not contain direct (hard coded) references to objects (with some rare and documented, exceptions).

To obtain a system that can be correctly documented and maintained, some design and coding practices have been respected. These guidelines are included as appendix F (text is based on a draft Q-Ray standard for VB coding).

4.2 Module structure

This system consists of the following modules (alphabetically):

- Canal.bas Contains global functions concerning editing the canal system, that are used in both editing forms (CNSYST.FRM and INTIPU.FRM).
- Check.bas contains global functions needed to handle communication with the file check form (FRMCHECK.FRM) from other forms.
- Constant.bas Declarations of constants needed to communicate with the windows environment, provided by Microsoft (the default file provided will not be altered or extended).
- Debug.bas Constants, global variables and functions for debugging purposes.
- Files.bas Contains constants and functions for file-handling (check existence, choose file to open/save...). Some of the functions may refer directly to a common-dialogue object to provide open-file-dialogues.
- Glo_data.bas Structures and functions that contain and manage data that must be available at more than one point (form) in the program. These data remain memory resident during an editing session, to avoid excessive, time consuming file access. This includes four classes of data: Crop-data, Soil-data, pump-data and markaz-data. This data is read from CROP.DEF, MARKAZ.DEF, PUMP.DEF and SOILS.TXT respectively.
- MDI.bas Contains constants and functions to handle communication with the main MDI-form. Typical functions here handle the display of messages in the status bar, enabling/disabling the button bar, etc..). Direct reference to controls on the MDI-form is unavoidable, but has been kept to a minimum to enable maintenance and reuse of code.
 - Note 1: Since the application will reside in an MDI-form, the functions "Main" and "End_App", used for starting and ending the application, are also located in this module.
 - Note 2: The reason to put MDI-related code in a separate module, and not in the MDI-form itself is to avoid direct reference of code in child forms to objects on the MDI-form. Using a module allows to hard-code pointers to the MDI-form only once, instead of in every child-form.
- Pump.bas Contains global functions concerning editing the pumps, that are used in both editing forms (INTIPU.FRM and SINGPUMP.FRM).
- Select.bas Contains functions and structures required to make single or multiple selections.
- Spr_Cons.bas
- Spr_func.bas These two files contain constants and functions required to handle Spreadsheet-objects.
- Windows.bas Contains global functions that handle MS-Windows specific functionality. Usually functions in this module call the MS-Windows API.

4.3 MDI structure

The layout and functionality of the main window is already described in chapter 3. Here we shall briefly mention the required objects and functions for the proper functioning of the MDI-form.

Objects on the MDI form:

- Context-window (a regular form, containing buttons that serve as a menu).
- Child windows to edit particular files (see form descriptions)
- Buttonbar with enclosed buttons and timer:
 - btnProject : Displays the context-window. Since only one window should be active it first issues the "Close" command to the active window;
 - btnNew : Passes the command "New" to the active form. The form will either know what to do, or ignore the command (in which case the button should normally not have been active in the first place);
 - btnOpen : Idem for Command "Open";
 - btnSave : Idem, "Save";
 - btnCheck : Idem, "Check";
 - btnExit : Exits the program (user will be prompted to save any edited data first, this is handled by the QueryUnload-event on each editable form);
 - tmrStatus : To regularly check status of the program. For reasons of speed, this control will contain some code and references directly some objects on the MDI-form.
- Statusbar, with enclosed panels and other objects:
 - Flood-bar : the statusbar itself fills to serve as a progress indicator eg. for reading large files. The code to control this flooding is located in MDI.bas;
 - Panels : for messages and key-status of NUM and CAPS keys;
 - Key-status objects : to monitor the status of NUM and CAPS keys;
 - tmrMsg : to allow display of a message during for a determined time (e.g. display a hint for 3 seconds).

Code on the MDI-form and its objects is limited. The buttons only contain a call to the function "Sendcommand (..Command..)". Code to show messages or to (de-)activate objects is located in the MDI.bas module to allow other forms to use this code.

The form-level functions for the MDI-form are:

- Sendmessage : Allows passing of commands to child-forms.
- ClearKeyStatus : Used only in startup (form_load), to represent the actual status of the keyboard on the status-bar.

Control level functions:

- Form_Load : Initialize the form and bring its status-indicators in sync with the actual status of the system. (In future: read and implement settings from ini-file).
- tmrStatus_timer : Check validity of status indicators, button-status and menu-items. When required: update status to reflect current situation. (Example: when no data is displayed, the Save button can not be active: this timer will de-activate the button if necessary).

4.4 Form structure

Every form in this system has a standard, consistent behaviour. To implement this, all forms are equipped with a set of functions that have the same name and structure, but which have been adapted for every form to implement the correct, form-specific behaviour.

Since form-level functions cannot be referenced by objects/code outside the form, a mechanism has been implemented to allow the MDIform and other objects to send commands to a child-form. This will be done by placing a Textbox called txtCommand on each relevant form. This Textbox (a VB object) can be filled by functions outside the form (notably by "Sendcommand" from the MDI) and is capable of reacting to commands.

To obtain a consistent structure, every form has an implementation of the following functions:

- AskForSave : Ask user in case form is cancelled or closed but edited data is not yet saved.
- Check_Data : Check the data displayed in the form. The user is notified if any warnings or errors are encountered that might interfere with correct execution of SIWARE programs.
- Clear_Data : Cleanup all form data (Notably before opening a file or when event_new is taking place).
- DoCommand : Handle the execution of commands (mostly, the commands are passed via the txtCommand control, but other form level functions are free to call DoCommand directly).
- Event_New : Handle the menu- or button-activated event "New".
- Event_Open : Idem, for "Open". It will behave much as other Open-command in a windows application (standard dialogue).
- Event_Save : Idem, for "Save".
- Event_Saveas : Idem, for "Save As..." (this event can also be called by the Event_Save function when no filename is defined yet).

- HlpInfo : returns a (column, row, control) specific help information through the standard Windows help utility.
- Read_File : Implement all specific read-actions for the file to edit (Filename must be known and accessible, Clear_Data is presumed done).
- Write_File : All specific write-actions for the file edited by this form.

Generally also an implementation of the following functions is included in the form :

- CheckCols : Checks the value of a specific field in a grid. Only used in grids, to check column values e.g. in the Check_data function.
- GetColHint : Gives a (usually column or row) specific hint text in the status bar.
- GetColWidth : returns the default width of a column in a grid. Only used in grids, to reset the original column widths.
- GetTitle : returns the title of the column (only used in grids).
- MakeClipString : makes a TAB and CR separated string to clip into a grid. Only used in grids, e.g. when reading a file into a grid.

Note: Some forms work (partially) with memory resident data. Reason to keep data memory resident is the fact that data are used through different forms. To prevent excessive file access, data are kept into memory. An example of this is the edit window for SOIL.TXT. Since for instance the soil code is used in various forms, the choice has been made to keep soil data memory resident. Forms that do not work with file-data will have a somewhat different implementation of the read/write functions.

Relevant control events on a form are:

- Form_Load : Initiation of form-level variables and controls.
- Form_QueryUnload : check whether data has been edited, if not: prompt for saving (Yes/No/Cancel).
- Form_Resize : Check correct size of form and placement of controls.
- txtEdit_Change : A command has been sent to the form. It should be passed to the docommand function.
- mnuXxxxx_click : All menu items have only the minimum of code. Actions are implemented in functions on the form level or in modules.
- All controls : Detect the change-event(s) and set a form-variable to indicate that data was changed (nlsEdited = True).
- Xxxxx_KeyUp : Calls the HlpInfo function to display control specific help information, through the Windows Help facility.
- Xxxxx_MouseMove : Calls the GetColHint function to display a control specific hint text in the statusbar

When appropriate, the following functions are also included:

- Line_Insert : Insert a new line (optionally with default values) into the grid. Put default values in edit-line and enable the edit-line controls.
- Line_Delete : Delete a line from the grid.
- Line_Duplicate : Copy a particular (grid-)line.

Some remarks on data integrity:

- All forms provide some way of manually checking their data-contents. These functions must be activated during the Event_Save(as) or when the user explicitly asks for a data-check (menu or button in button bar).
- Every form has its own data-checking functions. All data must be checked for validity in the earliest possible and practical moment.
- Warnings are given by means of standard dialogue boxes (MsgBox), and at moments where the user can still trace the action that generated the error/warning.

4.5 Distribution and installation

The user interface has to be installed from MS-Windows by a standard setup utility. The setup utility is made using the Setup-template that comes with Visual Basic under the name "Setup wizard". To install the user interface, insert the user interface disk (disk 1), choose the Run option under the Files menu and type a:\setup. The setup program will ask for a directory to copy the executable and related files into. Using the standard directory structure you should choose C:\SIWARE\PRGRS\EXECS. The setup program will now install all necessary files, create a SIWARE program group and program items for the interface and the SIWARE help utility.

To install the models, data sets and related files, a separate installation routine is used.

4.6 Use of different data sets

File-management is not included in the design of this system. The interface can only read/write/edit/check individual files. The program has no way to determine whether a group of files belong to a specific delta-area or a particular SIWARE-run.

Since the data for the Nile-delta are divided over several data sets or delta-areas, the program may encounter different data sets.

The installation program will create a default directory structure to maintain data from the West, Middle and East delta parts separately and a directory with a training data set (the same data set that is used in the manual). The complete directory structure is shown in figure 17.

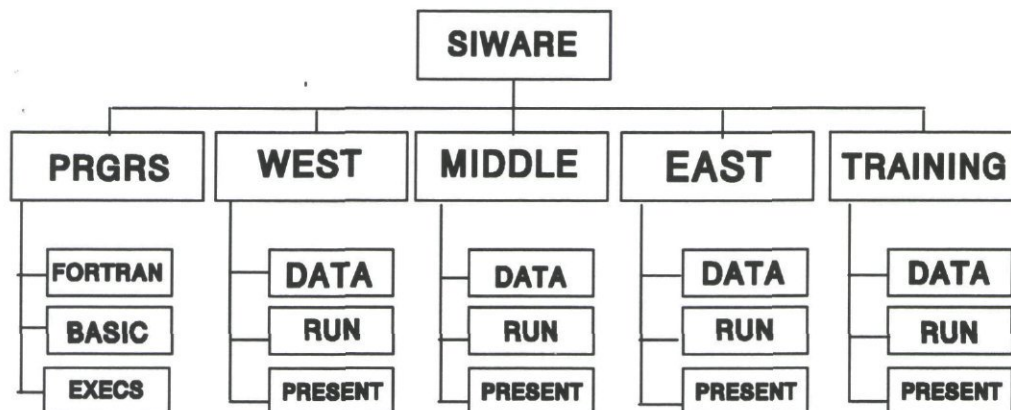


Figure 18: The default SIWARE directory structure

The /PRGRS directory is divided into two parts:

- SIWARE/PRGRS/FORTTRAN contains the source code of the four sub models and the auxiliary files;
- SIWARE/PRGRS/BASIC contains the source code of the EXPERT USERS' INTERFACE (EUI);
- SIWARE/PRGRS/EXECES contains the executables of the four submodels, the auxiliary programs and the EUI together with the executable file of the ICDS presentation system. It also contains the project files associated with the Fortran Power Station compiler.

For each Delta part three subdirectories are created:

- /DATA holds all data for a delta part;
- /RUN holds all current input/output files;
- /PRESENT holds all files associated with the ICDS presentation system including the SCDDATA.xx files produced by SIWARE.

The /TRAINING directory contains the data of the example described the manual.

The interface can switch from one directory to another by using the "Change Dir..." option available in the menu of the context-window.

4.7 Running the SIWARE models and auxiliary programs

Since MS-Windows supports multi-tasking, other programs can be started and run from the user interface. In the context window, the files menu contains a Run option. Choosing this option gives a window a text box where a command can be typed. The other option is to choose a standard option from the list box. These standard options contain all models and auxiliary programs. Pressing the execute button after typing or selecting a command, executes the chosen program.

The definitions of the standard programs mentioned above are included in the **SIWARE.INI** file. If the location of these programs is not according to the standard directory structure mentioned under par. 4.6, the directory in the **SIWARE.INI** file should be adapted accordingly.

4.8 Networks and Multi user usage

Usage of the program by more than one user on a network is possible.

The program is not able to detect the presence of other (concurrent) users on multi-user system or network. It is therefore possible that two users work on files in the same directory, or even on the same files.

It is the responsibility of the users or the system manager to prevent two users from using (notably: writing) the same file. Otherwise only the last written file will be saved for later use with the SIWARE model package.

4.9 Hard- and software requirements

The resulting interface-system is supposed to run on a platform that meets the following specifications:

Hardware:

- An Intel 386DX/33 processor or better (486/33 or faster recommended).
- Minimum of 12 Mb RAM. This seems a lot, but it is not. For running the SIWARE user interface a minimum of 4 Mb (excluding swap space) is needed. However, to be able to run the SIWARE models from within the interface 8 Mb extra memory is needed. A part of the recommended memory can be handled by creating a swap file under MS-Windows.
- At least 20 Megabyte of disk space available, of which approximately 3 MB must be available in the Windows-System directory. More space is recommended for comfortable working conditions.

Software:

- Dos 5.0 or higher installed.
- Windows 3.1 installed. When a network version of Windows is installed: contact your system-administrator to install files in the Windows System directory.

Notes:

- The designers-interface system is designed to work with a standard VGA resolution monitor. It will work with higher resolution monitors as well.
- When running the complete SIWARE system: check the current documentation of SIWARE for correct hard and software requirements for the complete system.

5. File descriptions and auxiliary programs

5.1 File descriptions

The exact file descriptions are included in appendix A. The descriptions are based on the standard file descriptions as included in reuse report number 40. For this project, the descriptions are extended with:

- detailed constraint-descriptions;
- default values when appropriate;
- estimated amount of data and file size
- warning-text when appropriate.

5.2 Auxiliary programs

The following (FORTRAN) programs are necessary to be able to make complete data sets and to check files for constraints that are not checked by the interface:

1) CREATCD(.FOR):

A program to convert the relative Markaz file(s) (MARKAZ.Rnn) into the input file CDext3.TXT. This is handled by the external FORTRAN program CREATCD (*.FOR/EXE).

A description of this program and its I/O is included in Reuse-Report number 40.

2) CHECKER(.FOR) and NEWTESTC(.FOR):

A program to check the contents of several SIWARE input files. Some of the more complex constraint checks are not done by the user interface. In these cases the user interface warns the user that one of these programs should be used before running SIWARE.

3) MK_MRKZ(.FOR):

A program to convert MARKAZ.nn into MARKAZ.Rnn.

4) CROPPAT(.FOR):

A program for checking the final cropping pattern in the file CDext3.TXT.

5) NEWTESTC(.FOR):

A program for checking the data of the file SECTION.ext1.

The interface has the Run option in the file menu from the context window, with default options that allow starting of these programs from within the interface.

Other programs can also be started from the interface, using the "Run..." option from the "File" options under the context window.

File descriptions

Contents

Files included in the designer-interface:

CNSYST.ext4
CRDVnn.TXT
CROP.DEF
CROPDUT.TXT
CRPCHR.TXT
CRPNME.TXT
DISRULE.TXT
GENERAL.TXT
GENINP.ext4
GRWUSE.DAT
HDext2.TXT
INTIDI.TXT
INTIPU.ext4
IRQUAN.ext4
MARKAZ.DEF
MARKAZ.nn
NAGRUS.ext4
PDreg.TXT
PERIOD.TXT
PUMP.DEF
REUSE.SEL
SECTION.ext1
SOIL.DEF
SOILS.TXT

CNSYST.ext4

Contents:

Definition of irrigation canal system on the basis of nodes; expert modifiable (editor).

Type:

Formatted, sequential

Size:

Variable; depending on number of irrigation canal nodes; 8 nodes/block;

A total of some 75 canals will contain 1000 nodes => 75 KB ?.

Format:

record	item	Format	description	dimensions
1	1	A4	name of irrigation canal	-
	2	I4	sequential canal number	-
	3	I4	number of nodes in this canal	-
2	1	I4	node number	-
	2	F8.2	X-coordinate node	Km
	3	F8.2	Y-coordinate node	Km
	4	F8.2	surface elevation	m amsl
	5	I4	code connected structure (0 or -1 when no structure present)	-
	6	I4	number of connected structure (0 or -1 when no structure present)	-
	7	I4	number of connected branch canal (0 or -1 when no branch canal is present)	-
	8	I4	node number of branch canal connected to this node or section	-
	9	F6.1	percentage of area of other main canal % downstream of this structure served through this structure	

Example:

SHAR	2	11							
25	131.50	14.75	17.00	0	0	0	0	0.0	
26	129.75	19.09	16.50	0	0	0	0	0.0	
27	131.79	22.20	16.00	0	0	0	0	0.0	
28	131.07	24.58	15.50	0	0	0	0	0.0	
29	132.84	28.73	15.25	0	0	0	0	0.0	
30	132.77	32.91	14.75	0	0	0	0	0.0	
31	132.75	33.75	14.25	0	0	0	0	0.0	
32	132.75	35.00	14.00	6	70	0	0	0.0	
33	132.75	36.00	13.75	6	72	0	0	0.0	
34	132.75	37.00	13.50	6	71	0	0	0.0	
35	132.46	38.00	13.25	3	2	0	6	0.0	
KHAN	4	2							
36	178.32	112.12	14.00	0	0	0	0	0.0	
37	179.15	113.98	13.40	0	0	0	0	0.0	

Constraints:

- Canal name : Max 4 characters, in [A..Z], [a..z] or [0..9]
- Canal seq.# : Must be unique
- # of nodes : Range [1 .. 99], must correspond to the lines underneath.
- Node# : Range [1 .. 999], determined from map while editing.
Must be unique within the file, which will be checked by program
CHECKER or NWTSTSEC.
- X-coor. : Range [-99999.99 .. 99999.99]
- Y-coor. : Range [-99999.99 .. 99999.99]
- Elevation : Range [-50 .. 50].
Must be a descending order (water goes down).
- Struct. code : Range [-1 .. 9],
Meaning of code:
-1, 0: No structure
1 ..
2 ..
3 ..
4 ..
5 ..
6 ..
7 ..
8 ..
9 ..
Structure-code of the first node in a canal must always be zero.
- Struct. # : Range [-1 .. 9999].
When struct. code is -1 or 0 then struc # = -1 or 0.
- Branch # : Range [-1 .. 9999].
- Node# of br. : Range [-1 .. 9999].
When branch # is -1 or 0 then node# = -1 or 0.
- Percentage. : Range [0.0 .. 100.0].
Note: could be a percentage, this will be checked.

Note:

After editing this file, the user must be notified that the file must be cheked using
CHECKER or NWTSTSEC.

Proposed layout for graphical interface:

Editable grid, like period.txt

CRDVcr.TXT

Contents:
Crop development data for crop 'cr'.

Type:
Formatted,sequential.

Size:
Variable; 1 rec/irrigation turn; 1 or 2 blocks; max. 15 files of 1 Kb each.

Format:
All records 3I4,F5.2,I3,F4.2,I4

record	item	Format	description	dimensions
i	1	I4	day when irrigation is applied	-
	2	I4	average crop height in following period	cm
	3	I4	average soil cover in following period	%
	4	F5.2	maximum infiltration opportunity time	d
	5	I3	maximum depth standing water layer (for all crops except rice 0 CM)	cm
	6	F4.2	fraction maximum area actually occupied by this crop	m ² .m ⁻²
	7	I4	average rooting depth in the following period	cm

Example:

290	0	0	0.50	00.25	10	! sowing and land preparation
305	0	10	0.50	00.50	10	
326	15	20	0.25	00.75	20	
347	30	60	0.25	01.00	25	
1	30	70	0.05	01.00	30	
15	30	70	0.05	01.00	30	
21	30	70	0.05	01.00	30	
42	30	70	0.25	01.00	30	
70	30	70	0.25	01.00	30	
85	30	70	0.25	01.00	30	
99	30	70	0.25	01.00	30	
113	30	70	0.25	01.00	30	
127	30	70	0.00	01.00	30	
151	0	0	0.00	01.00	0	! harvesting crop 01

Constraints:

- Day : A valid daynumber, range [1 .. 365] (leap years are irrelevant).
Numbers must be increasing, except for winter crops, where a leap from one year into another is allowed.
- Height : Must be in range [0 .. 1000] (trees)
- Cover : Range [0 .. 100].
- Infilt. : Range [0.00 .. 20.00]
- Layer : Range [0 .. 20]
Only for Rice can value be > 0
- Fract. : Range <0.00 .. 1.00]
Fraction numbers may not decrease.
- Rootd. : Range [0 .. 200]

Warning messages:

- Error: days do not form a correct sequence (line n).
- <variable> not in range [<min> .. <max>], <explanation>.

Remarks:

- Proposed layout for graphical interface:
- Editable grid, similar to period.txt.
- Option: show Height, cover and rooting depth in a graph to help detect anomalies.

CROP.DEF

Contents:

Crop definitions and crop specific data.

Type:

Formatted, sequential

Size:

Max. 5 Kb (50 crops).

Format:

Record	Item	Format	Contents
n	1	12,X	Crop number, [1..99], unique (key value)
	2	A20,X	Crop name
	3	A10,S	Crop type
	4	12,X	Aggregation number
	5	F4.1	Critical leaf potential

Layout:

1	L-Berseem	Winter	0	7.0
2	S-Berseem	Winter	0	7.0
3	Wheat	Winter	0	10.0
4	W-Vegetabl	Winter	0	5.0
5	Sugar beet	Winter	0	5.0
6	S-Vegetabl	Early_summ	0	5.0
7	Rice	Summer	0	5.0
8	Cotton	Summer	0	13.0
9	Maize	Summer	0	7.0
10	Nili Vegg	Nili	0	5.0
11	Trees	Perennial	0	15.0
12	Sprinkler	Perennial	0	7.0
13	Surface	Perennial	0	10.0
14	W-Fallow	Winter	0	16.0
15	S-Fallow	Summer	0	16.0
16	Full	Winter	3	7.0
17	Barley	Winter	3	10.0
18	Tirmis	Winter	4	7.0
19	Helba	Winter	4	6.0
20	Hummus	Winter	4	4.0
21	Lentils	Winter	4	6.0
... etc...				
50	Med-plants	Perennial	11	4.0

Constraints:

- Crop nr. : Must be unique in range [0..99]
- Crop name : Must contain only valid characters: [A..Z], [a..z], [0..9], underscore, minus sign or space.
- Crop type : One of the following strings: Perennial, Winter, Early_summ, Summer, Nili.
- Aggregation : The number of the crop under whose type the area can be aggregated for further calculations.
This value must be in the range of [0..13], where zero signifies that the crop need not be aggregated.
- Crit. leaf pot. : Range [0.0 .. 20.0]

In principle, no editing takes place in this file.

Should the need arise, the proposed layout for a graphical interface for this file is an editable grid, like period.txt.

CROPDUT.TXT

Contents:
Official waterduty (water requirement) for all crops on a decade basis, user modifiable (editor).

Type:
Formatted,sequential

Size:
Fixed; 5 blocks, < 3Kb.

Format:

record	item	Format	description						dimensions
1	1	I3	number of crops						-
2	1	I2, 2X	crop number						-
		NCRP I2, 2X	crop number						-
3	1	F5.3,X	water duty crop	1 month	JAN	period 1			m ³ .m ⁻²
	i						i		m ³ .m ⁻²
		NCRP F5.3,X					N		m ³ .m ⁻²
4	1	F5.3,X	water duty crop	1 month	JAN	period 2			m ³ .m ⁻²
	i						i		m ³ .m ⁻²
		NCRP F5.3,X					N		m ³ .m ⁻²
5	1	F5.3,X	water duty crop	1 month	JAN	period 3			m ³ .m ⁻²
	i						i		m ³ .m ⁻²
		NCRP F5.3,X					N		m ³ .m ⁻²
38	1	F5.3,X	water duty crop	1 month	DEC	period 3			m ³ .m ⁻²
	i						i		m ³ .m ⁻²
		NCRP F5.3,X					N		m ³ .m ⁻²

Example:

10									
1	2	3	4	5	6	7	8	9	10
0.082	0.041	0.069	0.000	0.000	0.000	....	0.000		
0.082	0.041	0.070	0.000	0.000	0.000	....	0.000		
0.082	0.041	0.070	0.000	0.000	0.000	....	0.000		
.
.
0.000	0.000	0.000	0.000	0.000	0.000	....	0.000		

Constraints:

- #Crps : Fixed at 15
- Crop# : Fixed, data copied from crop.def.
Numbers must be unique.
Order is assumed to correspond to crop.def.
- Duty : Range [0.000 .. 0.500].
Duty depends on crop-type. Certain crop types need water in certain decades:

Crop type	Water duty in decades:
Early summer	[4 .. 21]
Summer	[7 .. 33]
Nili	[19 .. 33]
Winter	[25 .. 36] and [1 .. 18]

Warning messages (proposed):

- Duty value out of range.
- Crop-type <type> should not need water in decade <n>.

Defaults:

A New... operation uses the crops from crop.def.

Proposed layout for graphical interface:

Editable grid, similar to period.txt.

CRPCHR.TXT

Contents:
Crop characteristics, expert-modifiable.

Type:
Formatted,sequential

Size:
Fixed; 1 block, < 1Kb.

Format:
All records I2,A8,F7.1,I2,15I1

record	item	Format	description	dimensions
i	1	I2	crop number	-
	2	A8	crop name	-
	3	F7.1	critical leaf potential (when evaporation starts reducing)	Bar
	4	I2	farmers irrigation preference score value	-
	5	I1	crop preference score value to be grown after crop 1	-
	6	I1	..... after crop 2	-
	7	I1	..... after crop 3	-
	8	I1	..... after crop 4	-
	9	I1	..... after crop 5	-
	10	I1	..... after crop 6	-
	11	I1	..... after crop 7	-
	12	I1	..... after crop 8	-
	13	I1	..... after crop 9	-
	14	I1	..... after crop 10	-
	15	I1	..... after crop 11	-
	16	I1	..... after crop 12	-
	17	I1	..... after crop 13	-
	18	I1	..... after crop 14	-
	19	I1	..... after crop 15	-

Example:

1L-BERS.	7.0	4000968700000000
2WHEAT	10.0	2000896700000000
3W-VEG	5.0	5000768900000000
4RICE	5.0	10897000000600000
5COTTON	13.0	6768000000900000
6MAIZE	7.0	8978000000600000
7S-VEG	5.0	9869000000700000
8FR. TREE	10.0	7000000090000000
9FALLOW	16.0	1000000009000000
10S-BERS.	7.0	3000869700000000

Constraints:

- Crop# : See Crop.def.
- Name : See Crop.def.
- Potent. : See Crop.def.
- Pref. : Range [1 .. 99].
Unique values (ranking).
- Score : Range [0 .. 9]
Numbers other than zero must be unique.

Certain crop-types cannot follow up one another:

- After Winter crop : no Winter, Nile or Perennial crops.
- After Early Summer crop : no Perennial or Early Summer crops.
- After Summer crop : no Early summer, Summer, Nili or Perennial crops.
- After Nile crop : no Early summer or Nili crops.
- After Perennial crop : no Winter, Early Summer, Summer or Nile crops.

Extra constraint:

When writing the file crpchr.txt, the contents of the file crpnme.txt should also be checked.

Warning messages (proposed):

- Invalid crop number.
- Critical leaf potential out of range.
- Preferences must be unique.
- Scores must be unique.
- Score value out of range.

Proposed layout for graphical interface:

Grid with 2 editable popups :

Editing of sequence preferences: via multiple select list, moving crops from one list to another.

Editing of Farmers irrigation preferences: via editable popup.

Note: the first three items are copied from the crop.def file and are not editable.

CRPNME.TXT

Contents:

Names of files with crop development data. This data will be furnished once, and is not supposed to be edited.

Type:

Formatted, sequential

Size:

Fixed; < 1Kb

Format:

All records 1X,A10

record dimensions	item	Format	description
i	1	1X,A10	name of file for data on crop growth development
	2	Free	comment on filename (essential?).

Example:

CRDV01.TXT	!	name of file with data for crop	01
CRDV02.TXT	!		02
CRDV03.TXT	!		03
CRDV04.TXT	!		04
CRDV05.TXT	!		05
CRDV06.TXT	!		06
CRDV07.TXT	!		07
CRDV08.TXT	!		08
CRDV09.TXT	!		09
CRDV10.TXT	!	name of file with data for crop	10

Note: the constraints on this file are only (optionally?) checked when crpchr.txt is saved.

Constraints:

Name : A valid and existing file name in the same directory.
Optionally: Crop number must be existing number (check in crop.def or number must be in range [1 .. 15]. However, since the data may also be storede in other files, this constraint will not be enforced/checked.

Warning messages (proposed):

- Not a valid (dos)file name.
- Non-existing file.
- Non-existing crop number.
- Incroorect filename format: must be CRDVnn.TXT.

DISRULE.TXT

Contents:

Definition of allocation rules, user modifiable

Type:

Formatted, sequential

Size:

Fixed; 1 block

Format:

All records 5X,F4.2

record	item	Format	description	dimensions
1	1	5X,F3.1	Fraction of residual irrigation water to be distributed proportional to demand	-
2	1	5X,F3.1	Fraction of residual irrigation water to be distributed proportional to area under keycrop	-

Example:

P1 = 0.0	!	P1 = distribution proportional to demand
P2 = 1.0	!	P2 = distribution proportional to area keycrop
	! ==>	P3 = distribution proportional to area served
	!	(calculated as 1.0 - P1 - P2)

Constraints:

P1 : Range [0.00 .. 1.00]

P2 : Range [0.00 .. 1.00]

$P1 + P2 \leq 1.00$

Proposed layout for graphical interface:

Two text-boxes.

GENERAL.TXT

Contents:

General, time independent, input data; expert-modifiable.

Type:

Formatted,sequential

Size:

Fixed; 1 block

Format:

All records 40X,F10.3

record	item	Format	description	dimensions
1	1	40X,F10.3	factor to calculate average conductivity of cracked soils from saturated hydraulic conductivity	-
2	1	40X,F10.3	factor for leaching efficiency of saturated soil. For cracked soils the efficiency is 0.1 with maximum crack volume (moisture content at wilting point)	-
3	1	40X,F10.3	factor for fraction of total drainage of rice field flowing through soil layers above drain depth.	-
4	1	40X,F10.3	factor to calculate hydraulic conductivity in horizontal direction from that one in vertical direction.	-
5	1	40X,F10.3	equivalent flow resistance of leakage or seepage flux when a claycap is missing.	d
6	1	40X,F10.3	average chloride content of fresh irrigation water.	Meq.l ⁻¹
7	1	40X,F10.3	fraction of drainage water from upstream areas which potentially is available for reuse.	-
8	1	40X,F10.3	fraction of drainage water,generated in a calculation unit , which is potentially available for reuse.	-
9	1	40X,F10.3	fraction of calculation unit where farmers have access to local drains	-
10	1	40X,F10.3	factor for multiplying demand to account for additional leaching.	-

Example:

FPERM-factor for rapid drainage	20.000
CREF -leaching eff. rapid drainage	1.000
FSTDTR-fast drainage rice fields	0.500
ANISO-anisotropy subsoil	15.000
BASRES-basic resistance leakage [d]	250.000
CHLNILE-basic Nile quality [Meq/l]	1.200
FRACU-max fraction ext drain water	0.250
FRAC1-max fraction int drain water	0.250
FRAC2-max fract of area with access to dr.	0.200
OVERIRR-extra water need for leaching	1.200

Constraints:

- FPERM : Range [0.000 .. 100.000]
- CREF : Range [0.000 .. 1.000]
- FSTDTR : Range [0.000 .. 1.000]
- ANISO : Range [1.000 .. 25.000]
- BASRES : Range [10.000 .. 1000.000]
- CHLNILE : Range [0.2000 .. 50.000]
- FRACU : Range [0.000 .. 1.000]
- FRAC1 : Range [0.000 .. 1.000]
- FRAC2 : Range [0.000 .. 1.000]
- OVERIRR : Range [1.000 .. 1.500]

Warning messages:

<variable> out of range [<lower> .. <upper>].

Proposed layout for graphical interface:

Textboxes, arranged vertically to conform layout of file.

GENINP.ext4

Contents:

General parameters regarding irrigation infrastructure; expert modifiable.

Type:

Formatted, sequential

Size:

Fixed; 1 block

Format:

All records 40X,F5.3

record	item	Format	description	dimensions
1	1	40X,F5.3	factor to multiply calculated demand to account for operational losses	-
2	1	40X,F5.3	slope of banks of irr. canals	$m^1.m^{-1}$
3	1	40X,F5.3	maximum capacity major irrigation tools	$m^3.s^{-1}$
4	1	40X,F5.3	maximum capacity additional irrigation tools	$m^3.s^{-1}$

Example:

OPRLOSS	- multiplier operational losses	1.200
SIDESLP	- side-slope irrigation canals	1.000
QMAXSAK	- maximum capacity sakkia	0.025
QMAXPUM	- maximum capacity diesel pump	0.050
FRACSAK		0.300
FRACPUM		0.700

Constraints:

- OPRLOSS : Range [1.000 .. 2.000]
- SIDESLP : Range [1.000 .. 3.000]
- QMAXSAK : Range [0.005 .. 0.050]
- QMAXPUM : Range [0.020 .. 0.100]

Warning messages:

<variable> out of range [<lower> .. <upper>].

Proposed layout for graphical interface:

Textboxes, arranged vertically to conform layout of file.

GRWUSE.DAT

Contents:

Quantities of drainage water used for each calculation unit; user modifiable.

Type:

Formatted, direct acces, recl=80)

Size:

Variable; depending on number of calculation units; 1 block/6 units; max. 500 units =>
max filesize approx. 50 Kb

Format:

All records 5x, 3F7.2.

record	item	Format	description	dimensions
i	1	X	Data that can be skipped (???)	-
	2	I4	calculation unit = record #	-
	3	F7.2	agric. groundw. abstr.	Mill. m ³ .yr ⁻¹
	4	F7.2	non-agric. grdw. abstr.	Mill. m ³ .yr ⁻¹
	5	F7.2	chloride content	meq.l ⁻¹

Example:

D	01	1.33	0.00	67.00
.				
.				
.				
D	24	1.33	0.00	35.00
D	25	1.05	0.00	65.00
D	28	10.02	0.00	13.00
D	29	1.37	0.00	8.50
D	30	0.47	0.00	8.90
D	31	1.14	0.00	10.00
D	32	1.96	0.00	6.80
D	36	1.19	0.00	5.60
D	37	9.18	0.00	14.00
D	38	6.94	0.00	10.00
.				
.				

Constraints:

- Calc.unit : Range [1 .. 999]
Inter file dependencies are checked by program CHECKER.
- Grw.Abst. : Range [0.00 .. 999.99]
- Chloride. : Range [0.20 .. 500.00]

Remarks:

- The record number must correspond to the calculation unit number.
- No Add/Delete of calculation units should be possible
- Missing values in the file (blanks) must be replaced by 0 in the editing-grid.
Blanks for groundwater abstraction: 0
Blanks for chloride content: 0.2

Proposed layout:

Editable grid, like PERIOD.TXT

HDext2.TXT

Contents:

Hydrological characteristics for all calculation units

Type:

Formatted,direct access,rec1=126

Size:

Variable; depending on number of calculation units; 4 units/block; max. 80 blocks => 40 kB

Format:

All records A6,2A3,I2,F5.2,F5.1,F5.2,3F6.1,F5.2,F5.1,F4.2, 2F6.1,F6.2,F5.2, 2I3,F5.2,I3,

record	item	Format	description	dimensions
i	1	A6	calculation unit number	-
	2	A3	code for climatic region (see file PETreg.TXT and REGION.TXT)	
	3	A3	code for region with same parameters for on-farm application efficiency (see file INIRS.TXT)	-
	4	I2	soil code(a number 1-10)	-
	5	F5.2	saturated hydraulic conductivity	m.d ⁻¹
	6	F5.1	drain spacing (normal conditions)	m
	7	F5.2	drain depth (normal conditions)	m
	8	F6.1	resistance radial flow to drain	d
	9	F6.1	resistance clay cap	d
	10	F6.1	resistance puddled surface layer in rice fields	d
	11	F5.2	water pressure in deep aquifer ("above" soil surface)	m
	12	F5.1	chloride concentration in deep aquifer	Meq.l ⁻¹
	13	F4.2	infiltration capacity (long term during irrigation)	m.d ⁻¹
	14	F6.1	acreage calculation unit (gross area)	Km ²
	15	F6.1	apparent drain space of modified system when drains are closed	m
	16	F6.2	apparent drain depth of modified system when drains are closed	m
	17	F5.2	thickness shallow aquifer	m
	18	I3	thickness clay cap	m
	19	I3	fraction of area which has access to drains for local reuse	%
	20	F5.2	fraction of area under cultivation	-
	21	I3	official fraction of cultivated area under rice (canal design purposes only)	%

Example:

SD001	ND	E4	1	0.15	25.0	0.75	3.04800.0	275.0	0.00235.00.05	34.7	0.0	|record
				0.0022.00	16	0 0.95 65						| 1
SD002	ND	E4	1	0.15	25.0	0.75	3.04800.0	275.0	0.00235.00.05	13.1	0.0	|record
				0.0022.00	16	20 0.92 65						| 2
SD003	ND	E4	1	0.15	25.0	0.75	3.04800.0	275.0	0.00235.00.05	51.9	0.0	|record
				0.0022.00	16	60 0.91 65						| 3
.
.
SD098	MD	E1	2	0.10	50.0	1.25	1.03600.0	200.0-2.80	5.00.10	62.2	10.0	
				22.0012.50	12	20 0.85 33						
SD099	MD	E1	2	0.10	50.0	1.25	1.02400.0	200.0-2.40	5.00.10	10.8	10.0	
				22.0012.50	8	50 0.83 33						
SD100	SD	E2	3	0.07	50.0	1.25	1.0	900.0	200.0 -.60	5.00.07	13.9	10.0|record
				22.0012.50	3	20 0.83 33						|100

Constraints:

- Calc. unit nr. : non editable field, automatische nummering
- Code clim. reg. : PET_{reg}.TXT needs to exist, where reg is equal to code.
- Code for region : PD_{reg}.TXT needs to exist, where reg is equal to code.
- Soil code : Range [1..99], soil code has to exist in SOILS.TXT
- Sat hydr conduct. : Range [0.01..9.99]
- Drain spacing : Range [1.0..999.9]
- Drain depth : Range [0.1..4.0]
- Resist radial flow : Range [0.1..10.0]
- Resist clay cap : Range [1.0..9999.9]
- Resist pudd. layer : Range [1.0..1000.0]
- Water press. d.a. : Range [-50.00..5.00]
- Chloride conc d.a. : Range [0.2..999.9]
- Infiltration cap. : Range <0.00..9.99]
- Acreage calc unit : Range [0.1..9999.9]
- App. drain space : Range [1.0..999.9]
- App drain depth : Range [0.1..4.0]
- Thickness s.a. : Range [1.00..99.99]
- Thickness clay cap : Range [0..999]
- Perc acces loc. use : Range [0..100]
- Frac under cultiv : Range [0.00..1.00]
- Perc under rice : Range [0..100]

Warnings:

- <variable> out of range [<Upper>, <Lower>]
- Invalid region code, file PET_{xx}.TXT has to be created
- Invalid code for region with same parameters for on-farm appl. efficiency, file PD_{xx}.TXT has to be created
- When leaving editing window: Suggestion: run checker.

Proposed Layout:

Grid with editable popup per record, like markaz.nn

Items should appear in a different more logical order, CR will propose an order.

INTIDI.TXT

Contents:

Distribution of irrigation intensity through the day for different seasons; expert modifiable.

Type:

Formatted,sequential

Size:

Fixed; 2 blocks

Format:

record	item	Format	description	dimensions
1	1	I2	number of time steps per day (=NTS)	-
2	1	I2, 3X	time moment 1	hour
	2	F5.1	maximum fraction of all farmers who irrigate this moment in winter	-
	3	F5.1	maximum fraction of all farmers who irrigate at this moment in summer	-
	4	F5.1	maximum fraction of all farmers who irrigate at this moment in spring/autumn	-
.
.
.
1+NTS	1	I2,3X	time moment NTS	hour
	2	F5.1	maximum fraction of all farmers who irrigate at this moment in winter	-
	3	I2	gate adjustment in winter	-
	4	F5.1	maximum fraction of all farmers who irrigate at this moment in summer	-
	5	I2	gate adjustment in summer	-
	6	F5.1	maximum fraction of all farmers who irrigate at this moment in spring/autumn	-
	7	I2	gate adjustment in spring/autumn	-

Example:

12								
3	0.1	1	0.4	1	0.2	1	= 3 a.m.	winter summer spring/ relative relative autumn capacity capacity relative capacity
5	0.1	2	0.4	1	0.2	2	= 5 a.m.	
7	0.1	0	0.8	1	0.2	0	= 7 a.m.	
8	0.5	0	1.0	0	0.5	1	= 8 a.m.	
10	1.0	0	1.0	0	1.0	2	= 10 a.m.	
12	1.0	0	1.0	0	1.0	0	= 12 a.m.	I I I
14	0.8	1	0.8	0	0.8	1	= 2 p.m.	I I I
16	0.8	2	1.0	1	1.0	2	= 4 p.m.	V V V
17	0.5	1	1.0	1	0.5	0	= 5 p.m.	
19	0.2	1	0.8	2	0.2	1	= 7 p.m.	
21	0.2	1	0.8	1	0.2	2	= 9 p.m.	
24	0.2	1	0.8	1	0.2	0	= 12 p.m.	

Constraints:

- Nr steps : Range [2 .. 24]
- time : [0..23],
Must be increasing in consecutive records.
Must be unique.
- Rel. cap. : Range [0.0 .. 1.0]
- Gateadj. : 0 = no action,
1 = adjust all structures,
2 = adjust main diversion structures only.

Note: The comments behind the data will not be taken into account when editing or saving data. They will be lost when a file is overwritten with edited data.
Additional information will be provided via a help-screen.

Warning messages:

- <variable> out of range [<lower> .. <upper>], <explanation>.
- At least two time steps required.

Proposed layout for graphical interface:
Editable grid, like period.txt.

INTIPU.ext4

Contents:

Discharge rates of pumps given as a linear function of water depth in canal: $Q = \text{var1} * (\text{water depth} - \text{var2})$ (m³/s).

If var1 = 0 the pump supplies water, in that case, var2 = supply rate.

Expert modifiable.

Type:

Formatted, sequential

Size:

Variable, depending on number of pumps; 2 blocks/pump, 7 pumps will lead tot approx. 7 Kb.

Format:

record	item	Format	description	dimensions
1	I3		number of irrigation pumps(=NP)	-
2	1 - NP F6.1		variable "var1"	(decade 1) m ² .s ⁻¹
3	1 - NP F6.1		variable "var2"	(decade 1) m or m ³ .s ⁻¹
4	1 - NP F6.1		chloride concentration (decade 1)	meq.l ⁻¹
.
.
.
107	1 - NP F6.1		variable "var1"	(decade 36) m ² .s ⁻¹
108	1 - NP F6.1		variable "var2"	(decade 36) m or m ³ .s ⁻¹
109	1 - NP F6.1		chloride concentration (decade 36)	meq.l ⁻¹

Example:

7 !input data of 1986						
0.0	0.0	0.0	0.0	0.0	0.0	0.0 => var1 |
6.7	6.0	4.9	0.0	5.2	-35.0	6.1 => var2 | 1 st 10-daily period
2.6	3.6	13.2	0.0	1.2	1.2	3.3 => [CL] |
0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.7	6.0	4.9	0.0	5.2	-35.0	6.1
2.6	3.6	13.2	0.0	1.2	1.2	3.3
.
.
.
0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.7	9.1	6.2	0.0	5.2	-32.0	9.2
3.6	4.1	10.1	0.0	1.2	1.2	3.4
0.0	0.0	0.0	0.0	0.0	0.0	0.0 => var1 |
13.7	9.1	6.2	0.0	3.4	-35.0	9.2 => var2 | 36 th 10-daily period
3.6	4.1	10.1	0.0	1.2	1.2	3.4 => [CL] |

Constraints:

- Nr-pumps : <0...999]
The number must correspond to the number of pumps for the regions under considerations, defined in PUMP.DEF.

Constraints for other variables depend on the type of pump, as determined from PUMP.DEF:

Feeder pumps:

- var1 : 0.0 (fixed)
- var2 : [0.0 .. 999.9]
- Cl : <0.0 .. 999.9]

Irrigation pumps:

- var1 : [0.0 .. 999.9]
- var2 : [0.0 .. 10.0]
- Cl : <0.0 .. 999.9]

Reuse pumps:

- var1 : 0.0 (fixed)
- var2 : [0.0 .. 999.9]
- Cl : <0.0 .. 999.9] (default = 1.2, Nile water)

For Reuse-pumps, the data is only known per month, therefore, the data for reuse-pumps will appear in groups of three identical decade-values for each month. Ideally, when editing data for a reuse pump, only 12 sets of data must be entered. When writing the file, the data for each month will be stored three times for each decade of the month.

Warning messages:

- Incorrect number of pumps. Numer of pumps must be nn as determined from PUMP.DEF.
- Incorrect value for var1, for a <type> pump, this value must be in range [nn ... nn]
- Idem for var2: [nn .. nn].
- Idem for chloride content: [nn .. nn]

Proposed layout for graphical interface:

Grid with editable popup : editable popup for every single pump

Optionally: show line graph with values for a variable to see trend.

IRQUAN.ext4

Contents:

Total quantity of available surface irrigation water for one year; user modifyable.

Type:

Formatted, sequential

Size:

Fixed, < 1Kb.

Format:

record	item	Format	description	dimensions
i	0	6X,I2	Ext4	
	1	F10.3	total quantity irrigation available in one year for the total study area	$10^6.m^3$
	2	F8.2	average chloride concentration irrigation water	$Meq.l^{-1}$
	3	4X,I2	number of periods where irrigation supply is preset: 1 - for one year 12 - per month 36 - per 10-dayly period	-
	4 thru (4+number of periods)		n(X, F5.3) fraction of total quantity supplied in this period.	

Example:

```
87 11433.226 1.20 36 0.022 0.025 0.005 0.005 0.026
0.018|
0.025 0.022 0.025 0.027 0.027 0.025 0.026 0.026 0.030 0.031 | one
0.041 0.047 0.046 0.046 0.047 0.040 0.039 0.041 0.033 0.031 | record
0.029 0.025 0.023 0.025 0.022 0.020 0.020 0.021 0.020 0.020 |
```

Constraints:

- Ext4 : Must correspond to file extension.
- Total qnt. : [0.. 999999> F10.3
- Number per. : [1, 12, 36] (can only decrease) F8.2
- Avg. Cl : [0.00 .. 99.99] I2
- Fraction : [0 .. 1.0] F5.3

Warning messages:

- Max quantity can not exceed ..
- Chloride concentration must be in range ... to ...
- A fraction must be in range 0 to ...
- The sum of all fractions must be 1.000

Proposed layout for graphical interface:

Two Text-boxes for total quantity and chloride above grid.

Radio buttons to choose between year / month / decade.

Editable grid, like period.txt, with two columns, fixed column for decade and editable column for fraction.

Optionally:

- when radio buttons are pressed, fractions can be automatically aggregated for new number of periods. precision can only be reduced, not increased.
- put textboxes over gridcells when editing.

MARKAZ.DEF

Contents:

Markaz definitions and markaz specific data.

Type:

Formatted, sequential

Size:

Max. 5 Kb (150 markaz).

Format:

Record	Item	Format	Contents
n	1	A1,X	Region, delta
	2	I4,X	Markaz number, [1..999]
	3	A10	Markaz name

Layout:

E	1	1st	Mrkz
E	2	2nd	Mrkz
M	1	1st	E Mrkz
M	45	45th	Mrkz
... etc...			

Constraints:

- Delta : The code for the delta region (A1 according to SIWARE conventions). Must be in domain ("E", "M", "W"). The range of values signifies: East, Middle, West).
- Markaz nr. : Range [1..999]
- Markazname : Must contain only valid characters: [A..Z], [a..z], [0..9], underscore or space.
- Key : The combination region + Markaz must be unique

Proposed layout for graphical interface:

Should the file be included : editable grid.

MARKAZ.nn

Contents:

Cropping pattern per markaz, areas in Feddan.

The extension must be a number and must correspond to an "ext3" from the file PERIOD.TXT.

Type:

Formatted, sequential

Size:

Possibly more than 150 markazes, with 50 crops each. Max. 100 Kb (possibly > 150 lines, 500 char. long).

Format:

Record	Item	Format	Contents
1	1	A80	Comment text
2	1	23X	Blanks
	2..41	40(A10,X)	Crop names, seperated by a space
3	1	23X	Blanks
	2..41	40(5X,I2,X,I2)X	Crop number and numb of crop for aggregation
4	1	23A	Header: 'Markaz...Region, Nr..Net Area'
	2..41	40(A10,X)	Crop type
5>>	1	A10	Markaz name
	2	A	Delta or region where the markaz is situated
	3	I4	Markaz number
	4	I8	Markaz net-area
	4..54	50(2X,I8,X)	Area of crop in markax

Example:

```
First line is comment text, up to 80 characters long .....]
      L-Berseem   S-Berseem
....5....0....5....0      1 0      2 0 ... and so forth .. >>>
Markaz, reg, nr, area      Winter      Winter
1st Mrkz  E   1   43200      20      90 .... etc...
2nd Markaz E   2   78901      34     123
1st M mrkz M   1   98765      56     456
45th mrkz  M  45   43210      78     789
... etc...                      ..... etc...
```

Constraints:

- Crop.name : No longer than 10 characters.
- Crop.nr. : [1..99], unique numbers, must exist in crop-file.
- Crop.type : One of the following: Perennial, Winter, Early_summ, Summer, Nili. Values will correspond with data from crop-file.
- Mrkz.delta : The one character code for the delta or region where the markaz is in. Valid codes: "E", "M", "W".
- Mrkz.nr. : Range <0..99]. The combination of markaz.delta and markaz number must be unique.
- Mrkz.area : Range <0..10E8>. Since this data is time dependent, it is decided to store the net area per markaz in this file and not in the markaz-definition file.
- Delta : The markazes in one file/screen must either: all be from one single region, or include all markazes from the complete study area.
- Area_1 : Sum of areas for:
Winter crops + Perennial crops = markaz.net_area
- Area_2 : Sum of areas for:
Early_summ crops + Summer crops + Perennial crops
= markaz.net_area
- Area_3 : Sum of areas for:
Summer crops + Nili crops + Perennial crops = markaz.net_area

Proposed layout :

Grid with editable popup per grid line (=per markaz) :

The grid shows all markaz data from the area, while the popup will show the data of the selected markaz.

Defaults:

A default/new operation will result in values of zero for all crop areas. Crop and markaz data will in that case be read from the CROP.DEF and MARKAZ.DEF files. T

When opening an existing file: data will be read from file, no checks are done on the markaz- or crop-definition files (this allows existence of older markaz.nn files after crop or markaz definitions are altered).

NOTE: It is noted that this situation can lead to output for a situation that is no longer currently in place.

Remarks:

- 1) Data that is read from crop-file (crop name and crop type) or markaz-file (name, area) could be left out of the markaz.nn file. It is redundant since the actual value can always be retrieved from the other data files.
- 2) Crop and markaz names are included to provide information in case a user wants to enter/alter this file manually (e.g. on another platform).
- 3) The Markaz.nn file can be converted to a Markaz.Rnn file with the auxiliary program MK_MRKZ

MARKAZ.Rnn

Contents:

Relative cropping pattern per markaz, areas in percentage.

For 15 crop types, the relative coverage of each crop type is given in percentages. This data is accumulated from a Mrakaz.nn file but can be edited by an expert.

The file-extension must be an "R" followed by a number and must correspond to an "ext3" from the file PERIOD.TXT.

Type:

Formatted, sequential

Size:

Possibly more than 150 markazes, with 15 crops each. Max. 40 Kb (possibly > 150 lines, 120 char. long.

Format:

Record	Item	Format	Contents
1	1	A80	Comment text
2	1	23X	Blanks
	2..41	40(A10,X)	Crop names, seperated by a space
3	1	23X	Blanks
	2..41	40(5X,I2,X,I2)X	Crop number and numb of crop for aggregation
4	1	23A	Header: 'Markaz...Region, Nr..Net Area'
	2..41	40(A10,X)	Crop type
5>>	1	A10	Markaz name
	2	A	Delta or region where the markaz is situated
	3	I4	Markaz number
	4	I8	Markaz net-area
	4..54	156(2X,F8.2,X)	Percentage of markaz covered by crop

Example:

```
First line is comment text, up to 80 characters long .....]
      L-Berseem   S-Berseem
      1  0       2  0   ... and so forth .. >>>
Markaz, reg, nr, area   Winter   Winter
1st Mrkz  E   1   43200    1.20    3.90   .... etc...
2nd Mrkz  E   2   78901    2.34    14.23
51st Mrkz  M   1   98765    12.56    2.56
45th Mrkz  M  45   43210    34.78    1.78
... etc...                      ..... etc...
```


Constraints:

- Crp.name : No longer than 10 characters.
Only crops that have an aggregation number of zero in CROP.DEF.
- Crop.nr. : [1..99], unique numbers, must exist in crop-file.
- Crop.type : One of the following: Perennial, Winter, Early_summ, Summer, Nili.
Values will correspond with data from crop-file.
- Mrkz.delta : The one character code for the delta or region where the markaz is in. Valid codes: "E", "M", "W".
- Mrkz.nr. : Range <0..99]. The combination of markaz.delta and markaz number must be unique.
- Markaz.area : Range <0..10E8>. Since this data is time dependent, it is decided to store the net area per markaz in this file and not in the markaz-definition file.
- Delta : The markazes in one file/screen must either: all be from one single region, or include all markazes from the complete study area.
- W-Fallow : 100.00 minus sum of percentages for Winter crops + Perennial crops = Winter-Fallow.
- S-Fallow : 100.00 minus sum of percentages for Early_summ crops + Summer crops + Perennial crops = Summer Fallow. This number cannot be negative.
- Summer : Sum of areas for:
Summer crops + Nili crops + Perennial crops = 100
(e.g. Nili Crops = Summer Fallow + Early Summer. This number cannot be negative.

Proposed layout :

Grid with editable popup, like markaz.nn

Defaults:

The correct ways to edit this file would be to copy and edit an existing file or to calculate relative values from an existing Markaz.nn file.

A default/new operation will result in values of zero for all crop areas. Crop and markaz data will in that case be read from the CROP.DEF and MARKAZ.DEF files.

Consideration: disable the New.. operation.

When opening an existing file: data will be read from file, no checks are done on the markaz- or crop-definition files (this allows existence of older markaz.nn files after crop or markaz definitions are altered).

NOTE: It is noted that this situation can lead to output for a situation that is no longer currently in place.

Remarks:

- 1) See Markaz.nn
- 2) See Markaz.nn
- 3) The Markaz.Rnn file can be converted to the (required) CDext3.TXT file using the fortran program CREATCD.

NAGRUS.EXT4

Contents:

Non agricultural uptake and reuse-pump activities from irrigation canals.

User modifiable.

A reuse pump has a positive supply rate, a -1 for section number and a negative chloride content. A non-agricultural pump has a negative supply rate, a positive (existing) section number and a positive chloride content.

Type:

Formatted, sequential

Size:

Depending on number of nodes with non-agr. uptake, 14 nodes/block, max 400 nodes, 27 blocks, 14 Kb.

Format:

record	item	Format	description	dimensions
i	1	I4	node number of irrigation canal where supply or withdrawal occurs	-
	2	F8.3	rate of supply (+) or withdrawal (-)	$\text{m}^3.\text{s}^{-1}$
	3	I4	section number drainage canal which receives this water as sewage water (section ≤ 0 when no sewage water is generated)	-
	4	F8.2	chloride concentration of disposed sewage water	Meq.l^{-1}

Example:

3	-6.020	33	4.00	
7	-0.010	35	4.00	
9	-0.010	35	4.00	
.	.	.	.	
.	.	.	.	
.	.	.	.	
123	9.810	-1	-4.00	=> reuse pump
124	-0.020	109	4.00	
125	-0.020	109	4.00	
.	.	.	.	
.	.	.	.	
.	.	.	.	
202	10.70	-1	-4.00	
203	-0.02	11	4.00	
204	-0.02	11	4.00	

Constraints:

- Node number : <0 .. 999] I3
- Supply rate : Non agric. pump: <-999.999 .. 0.000] F8.2
Reuse pump: [0.000 .. 999.999]
- Section # : Non agric. pump: <0 .. 999] I4
Reuse pump: -1
- Cl conc. : Non agric. pump: <0 .. 99.99] F8.2
Reuse pump: [-99.99 .. 0>

Warning messages:

- Invalid node number, must be in range [1 .. 999]
- Invalid section number, must be in range [1 .. 999]
- Supply rate out of range
- Chloride concentration out of range
- Chloride concentration must be negative for reuse-pump.

Remarks:

- Negative section numbers indicate reuse pumps.
- Inter-file dependency (node numbers, section numbers) are deliberately not described. Final control is done by the Checker program.
- When user wants to create a new file, he should preferably make a copy of an existing file. Only after an explicit warning should he be allowed to create a completely new file.
- When data is written or presented, ordering by node-number will increase the readability of the data. If possible: sort by node number.

Proposed layout for graphical interface:

Editable grid, like period.txt.

PDreg.TXT

Contents:

Data on surface irrigation process per region 'reg', expert modifiable.

Type:

Formatted, sequential

Size:

Fixed; 1 record/crop; 1 block => 0.5 kB (3 files)

Format:

All records I4,2F7.1,F6.4,2F5.3,F7.2,F5.3,A1

record	item	Format	description	dimensions
i	1	I4	cropnumber	-
	2	F7.1	plotlength	m
	3	F7.1	plotwidth	m
	4	F6.4	plotslope	$m \cdot m^{-1}$
	5	F5.3	Manning coefficient	$m^{-1/3} \cdot s$
	6	F5.3	relative wetted area during irrigation (1= basin irr., < 1 = furrow irrigation)	$m \cdot m^{-2}$
	7	F7.2	on-farm conveyance losses	$m^3 \cdot d^{-1}$
	8	F5.3	capacity irrigation tool	$m^3 \cdot s^{-1}$
	9	A1	Drainage pipes closed for rice cultivation (Y=yes, N=no), use capitals	-

Example:

1	20.0	20.00.00050.15	1.0	40.0	0.02	N
2	20.0	20.00.00050.1	0.8	40.0	0.02	N
3	10.0	10.00.00050.1	0.6	40.0	0.02	N
4	20.0	20.00.00050.15	1.0	40.0	0.02	N
5	10.0	10.00.00050.04	0.5	40.0	0.02	N
6	20.0	20.00.00050.1	0.8	40.0	0.02	N
7	10.0	10.00.00050.1	0.6	40.0	0.02	N
8	10.0	10.00.00050.04	0.5	40.0	0.02	N
9	40.0	40.00.00050.15	1.0	40.0	0.02	N
10	20.0	20.00.00050.15	1.0	40.0	0.02	N

Constraints:

- Cropnumber : The corresponding crop in CROP.DEF has to be an aggregated crop (meaning aggr. nr = 0 in CROP.DEF).
- Plotlength : Range [1.0..100.0]
- Plotwidth : Range [1.0..100.0]
- Plotslope : Range [0.0001..0.0100]
- Manning coeff. : Range [0.001..1.000]
- Relative wetted area : Range [0.1..1.000]
- On-farm conv. loss : Range [0.0..99999.9]
- Capacity irr. tool : Range [0.01..0.25]
- Drain pipes closed : Valid codes [Y,N]

Warnings:

- <variable> out of range [<Upper>, <Lower>]
- invalid cropnumber, must be an aggregated crop in CROP.DEF

Remarks:

- When data for less than 15 crops is available, this will not pose a problem for SIWARE. However, when more than 15 lines of data (crops) are given, the SIWARE programs will need adjustment.

Proposed Layout:

Editable grid, like period.txt

PERIOD.TXT

Contents:

Extensions that determine the data for different runs of the program REUSE

Type:

Formatted, sequential

Size:

Max. 2Kb (approx. 100 years/runs/strategies).

Format:

6(A3), conform description in reuse report 40.

Layout:

Will be conform description in Reuse Report number 40: 6 items of identical format, each three characters long, containing a right-aligned integer between 0 and 99 (inclusive).

The meaning of items 1 to 6 are described in reuse-report.

Constraints:

- Item 1 : Signifies the year to simulate, [0..99].
No special requirements, used to create output files only (existing files will be overwritten?).
- Item 2 : Ext1, each of the following files must exist and must be read accessible:
 - SIMSEQ.nn (nn = the number ext1)
 - SECTION.nn
 - RPSSCS.nn
- Item 3 : Ext2, the following file must be present and R/W accessible:
HDnn.TXT. (write access required for program REUSE)
- Item 4 : Ext3, the following file must be readable:
CDnn.TXT (or the MARKAZ.nn file must be present so CDnn.TXT can be derived from it.
- Item 5 : Ext4, the following file must be readable:
CNSYST.nn
NAGRUS.nn
GENINP.nn
IRQUAN.nn
INTIPU.nn
- Item 6 : Signifies strategy number, range: [1..99]. Used for output file-names only, no special requirements (existing files will be overwritten).
The data must consist of an ascending sequence of integers, without missing values in between. The first strategy must be numbered "1".

Warning messages:

- If one of the required files is missing: "Warning: File <name>.<nn> must exist when this extension is used when running the model."
- If the strategy numbers do not form a correct sequence: "Warning: Strategy numbers must form a correct, ascending sequence, without missing values."
- Warning message when strategy does not start at 1.

PUMP.DEF

Contents:

Definitions of Pump-stations for delta regions.

Type:

Formatted, sequential

Size:

Max. 1 Kb (50 Pumps).

Format:

Record	Item	Format	Contents
n	1	A1,X	Region, delta
	2	I3,X	Pump number, [1..999]
	3	A,X	Pump type: F, I, R.
	4	A10	Pump name

Layout:

```
E  1 R First Pump
E  2 I Secnd Pump
E  3 F Third pump
E 45 R extra pump
... etc...
```

Constraints:

- Delta : The code for the delta region (A1 according to SIWARE conventions). Must be in domain ("E", "M", "W"). The range of values signifies: East, Middle, West).
- Pump nr. : Range [1..999]
- Pump Type : F: Feeder, I: Irrigation, R: Reuse pump.
- Pump name : Must contain only valid characters: [A..Z], [a..z], [0..9], underscore or space.
- Key : The combination region + Pump nr must be unique.

REUSE.SEL

Contents:

Global program options and settings.

Type:

Formatted, sequential.

Size:

Max. 2 K (approx. 1 page of text).

Format:

Format when reading complete file: (12(/), 5(68X,F5.1/), 2(68X,I4/), 3(/), 68X,I4/, 3(/), 4(68X,I4/)

Example:

```
*-----*
*      R E U S E   O F   D R A I N A G E   W A T E R   P R O J E C T      *
*                               D R I - I C W   ( s i n c e   1 9 8 9   W S C )   *
*-----*
*      File REUSE.SEL contains a number of options for the programs      *
*      DESIGN, WATDIS, and REUSE.                                         *
*-----*
*      WARNING! -> The structure of this file should not be changed.      *
*      Just fill out the requested answers !!!                             *
*-----*
*      Requested output/options for program DESIGN                        *
*----- YES = -1.0 ----- NO = 1.0 -----*
-> target level control           ? your choice (Y=-1.0,No=1.0) :-1.0
-> waterduty according official data ? your choice (Y=-1.0,No=1.0) :-1.0
-> waterduty based on net area     ? your choice (Y=-1.0,No=1.0) : 1.0
-> supply to main canals preset    ? your choice (Y=-1.0,No=1.0) :-1.0
-> dimensions system include reuse ? your choice (Y=-1.0,No=1.0) : 1.0
-> include rainfall data          ? your choice (Y= 1 ,No= -1) : 1
-> include groundwater use        ? your choice (Y= 1 ,No= -1) : 1
*-----*
*      Requested output/options for program WATDIS                      *
*----- YES = 1 ----- NO = 0 -----*
-> application in SIWARE package   ? your choice (Y= 1 ,No= 0) : 1
*-----*
*      Requested output/options for program REUSE                      *
*----- YES = 1 ----- NO = 0 -----*
-> output per crop & distributary   ? your choice (Y=1,No=0) : 0
-> mapping output, distribution in space ? your choice (Y=1,No=0) : 1
-> plotting time dependent output    ? your choice (Y=1,No=0) : 0
-> coupling SIWARE with groundwater model? your choice (Y=1,No=0) : 0
```

Table 1: Description file contents and meaning of selectors

Options	Y	N	Function
Target level control	-1.0	1.0	Water distribution based on target levels; if not, then through gate opening.
Waterduty according official data	-1.0	1.0	Crop waterduty based on officialdata eg. MPWWR, if not, file INWADU has to generate through program WDUTY.
Waterduty based on net area	-1.0	1.0	Official waterduty based on net agricultural area, if not then gross area.
Supply to main canals preset	-1.0	1.0	Supply to main canals preset; if not then supply = demand - reuse.
Dimensions system include reuse	-1.0	1.0	Dimensions canal system include official reuse supply = demand - reuse.
Include rainfall data	1	-1	Selector for including rainfall in water allocation. If selected, files PETreg.TXT must be available.
Include groundwater data	1	-1	Selector for including groundwater use. If selected, file GRWUSE.TXT must be available.
Application in SIWARE	1	0	Selector for output of WATDIS. Must be yes when output of WATDIS will be used to run REUSE. Must be no when output of WATDIS is needed on screen or on file, or when output is needed for calibration purposes.
Output per crop & calculation unit	1	0	Request for detailed output per crop per calculation unit.
Output on maps	1	0	Request for graphical presentation of output on distribution in space.
Output on plots	1	0	Request for graphical presentation of output distribution in time.
Coupling SIWARE with groundwater model	1	0	Selector for coupling with groundwater model. This option is not incorporated in the interface, must always be no.

Table 2: Text in windows for describing selectors and short explanatory text on textbar

Option	Text/window
	0.....1.....2.....3.....4
	Textbar/explanation
	0.....1.....2.....3.....4.....5
* Target level ...	Level control at control structures
	Target waterlevels otherwise structure settings
* Waterduty ...	Official waterduty
	Official duties or calculated through model (Wduty)
* Waterduty ... area	Waterduty for net agricultural area
	Waterduty for net area, otherwise gross area
* Supply ... canals	Supply to study area preset
	Supply preset otherwise supply = demand - reuse
* Dimensions system	Canal dimensions adjusted for pumps
	Area served thru pumps in design otherwise excl.
* Include rainfall	Including rainfall in water allocation
	Rainfall included in allocation otherwise ignored
* ... groundwater ..	Including groundwater use
	Groundwater use included otherwise ignored
* Application ...	Will not appear in the interface, data will be fixed to Yes (1)
* Output per crop &	Output per crop and calculation unit
	Per crop per calculation unit otherwise suppressed
* Output on maps	Output on maps
	Output on maps, otherwise suppressed
* Output on plots	Time dependent graphs
	Time dependent graphs otherwise suppressed
* Coupling SIWARE	Coupling SIWARE with groundwater model
	Groundwater model applied otherwise ignored.

Constraints:

GRWUSE.TXT File must be present when option for ground water is turned on (seventh option = -1.0).

SECTION.ext1

Contents:

Definition of drainage system based on sections

Type:

Formatted,sequential

Size:

Variable; depending on number of drain sections; 13 sections/block; max. 65 blocks, 30 Kb.

Format:

All records 9I4

record	item	Format	description	dimensions
i	1	I4	number section drainage canal	-
	2	I4	previous section of this canal (-1 when no previous is present)	-
	3	I4	next section of this canal (-1 when no previous is present)	-
	4	I4	previous section in simulation sequence (-1 when no previous is present)	-
	5	I4	next section in simulation sequence (-1 when no previous is present)	-
	6	I4	simulation level	-
	7	I4	calculation unit number (0 or -1 when non is present)	-
	8	I4	section number of connected branch canal (-1 when no branch canal is connected)	-
	9	I4	section number from which non official reuse takes place (-1 when reuse takes place from previous section of this canal)	-

Example:

1	-1	2	-1	2	1	96	-1	-1
2	1	3	1	28	1	97	-1	-1
3	2	4	30	26	1	67	-1	-1
4	3	5	27	5	1	-1	27	-1
26	-1	27	3	27	1	95	-1	-1
27	26	-1	26	4	1	68	4	-1
5	4	6	4	6	1	-1	30	-1
28	-1	29	2	29	1	18	-1	-1
29	28	30	28	30	1	98	-1	2
30	29	-1	29	3	1	99	5	-1
6	5	7	5	7	1	69	-1	-1
.
.
.
216	87	-1	87	208	3	-1	208	-1
217	144	-1	144	86	3	-1	211	-1
218	-1	-1	152	159	1	101	-1	-1

Constraints:

- Section# : Range [1 .. 9999]
- Prev. in canal : Range -1, or [1 .. 9999]
- Next in canal : Range -1, or [1 .. 9999]
- Prev. in sim. : Range -1 or 0
- Next in sim. : Range -1, or [1 .. 9999]
- Sim.level : Range [1 .. 999]
- Calc.Unit : Range [-1 .. 9999]
- Conn. sect. : Range -1 or [1 .. 9999]
- Reuse sect. : Range -1, or [1 .. 9999]

Note: after saving, the user must be notified that the programs CHECKER and NWTSTSEC are required to check the contents of the file.

Warning messages:

- Invalid number <nr> for <column name> in section <nr>, line <nn>.

Proposed layout for graphical interface:

Grid, like Period.txt.

SOILNAME.DEF

Contents:
Soil names corresponding to soil numbers used throughout the SIWARE system; expert modifiable (editor).

Type:
Formatted,sequential

Size:
Fixed; 1 record/soil type; 2 blocks => 1kB

Format:
All records: I2, A20

record	item	Format	description	dimensions
i	1	I2	soil code	-
	2	A18	Soil name	-

Example:

1	basin clay
2	silty clay
3	silty clay loam
4	clay loam
5	sandy clay loam
6	loam
7	silt loam
8	sandy loam
9	loamy fine sand
10	medium fine sand

- Constraints:
- Soil code : Range [1..99], Unique, Should be in memory
 - Soil name : Must contain only valid characters: [A..Z], [a..z], [0..9], underscore or space.

Proposed Layout:
Not editable by interface. The file will be delivered once and should not be modified.

SOILS.TXT

Contents:

Soil physical and hydraulic characteristics for all soil types; expert modifiable (editor)

Type:

Formatted,sequential

Size:

Fixed; 1 record/soil type; 2 blocks => 1kB

Format:

All records I2,I6,3F6.3,I7,3F8.6,6F6.3

record	item	Format	description	dimensions
i	1	I2	soil code	-
	2	I6	minimum dry bulk density	Kg.m ⁻³
	3	F6.3	moisture cont. at saturation	m ³ .m ⁻³
	4	F6.3	moisture cont. at field cap.	m ³ .m ⁻³
	5	F6.3	moisture cont. at wilting p.	m ³ .m ⁻³
	6	I7	slope function DBD=F(MC) (dry bulk density DBD as function of moisture content MC)	Kg.m ⁻³
	7	F8.6	the parameter a1 in emperical funtion for maximum capillary flux	-
	8	F8.6	the parameter a2	-
	9	F8.6	the parameter a3	-
	10	F6.3	the parameter b1 in emperical function for maximum capillary	-
	11	F6.3	the parameter b2	-
	12	F6.3	the parameter b3	-
	13	F6.3	the effective thickness of the zone below a rootzone which provides water to the rootzone through capillary flow	m
	14	F6.3	(vertical) saturated hydraulic conductivity	m.d ⁻¹
	15	F6.2	diffusivity	cm ² .d ⁻¹

Example:

1	1000	0.540	0.519	0.321	-20000.0005890.0022700.006560	0.840	3.520	9.040	0.25	.050	11.00
10	1400	0.350	0.155	0.023	00.0044801.1900000.000000	2.140	8.630	0.000	0.300	1.100	15.00
2	1000	0.507	0.463	0.257	-15000.0009510.0040600.013800	0.392	1.700	4.290	0.500	.075	6.00
4	1200	0.445	0.406	0.242	-9000.0064000.0201000.000000	0.203	5.000	0.000	0.500	.075	16.00
3	1200	0.475	0.372	0.185	-5000.0015500.0188000.000000	0.444	2.330	0.000	0.750	.100	16.00
5	1300	0.432	0.338	0.180	-3000.0016300.0856000.000000	0.432	2.500	0.000	0.500	.250	30.00
6	1300	0.503	0.420	0.098	-1000.0049500.1640000.000000	0.900	3.670	0.000	0.500	.050	89.00
7	1300	0.509	0.461	0.092	00.0049500.0802000.000000	0.600	2.280	0.000	0.50	.075255.00	
8	1300	0.465	0.260	0.061	00.0066300.6920000.000000	0.611	12.900	0.000	0.400	.200	5.00
9	1300	0.439	0.179	0.060	00.0012200.0995000.000000	0.540	3.000	0.000	0.300	.250	22.00

Constraints:

- Soil code : Range [1..99], Unique, Should be in memory
- Min.dry blkdns. : Range [500..2000]
- M.c. saturation : Range [0.250..0.700]
- M.c. field cap. : Range [0.100..0.700]
- M.c. wilting point : Range [0.010..0.400]
- Slope function : Range [-3000..0]
- A1 : Range [0.000000..9.999999]
- A2 : Range [0.000000..9.999999]
- A3 : Range [0.000000..9.999999]
- B1 : Range [0.000..99.999]
- B2 : Range [0.000..99.999]
- B3 : Range [0.000..99.999]
- Eff. thickness : Range <0.000..2.500]
- Sat hydr cond. : Range <0.000..3.000]
- Diffusivity : Range <0.00..999.99]

Inter field dependencies:

M.c. saturation > m.c. field. cap. > m.c. wilt.

Warnings:

- <variable> out of range [<Upper>, <Lower>]
- Value of <variable1> should be smaller than value of <variable2>

Proposed Layout:

Grid with editable popup, like markaz.nn

Screen descriptions

Contents

Files for which a screen is designed:

CNSYST.ext4
CRDVnn.TXT
CROPDUT.TXT
CRPCHR.TXT
DISRULE.TXT
GENERAL.TXT
GENINP.ext4
GRWUSE.DAT
HDext2.TXT
INTIDI.TXT
INTIPU.ext4
IRQUAN.ext4
MARKAZ.nn
NAGRUS.ext4
PDreg.TXT
PERIOD.TXT
REUSE.SEL
SECTION.ext1
SOILS.TXT

File: CNSYST.ext4

Description

The main screen contains two grids. The small grid contains only the canal names, canal numbers and the number of sections in each canal. Double clicking on this grid starts the popup-edit window.

The other grid contains the complete set of data as it will appear in the file when saved. This grid is for viewing purposes only and can not be used for editing. The viewing grid can of course be used to scroll through the data.

The popup window allows editing of the canal name and number in textboxes. The data for one section can be typed directly into the grid fields.

When the popup is closed, the data in the main window is updated. For large data sets, updating the largest grid might take some seconds.

Editing possibilities in main window:

Edit Canal	Via menu or double click; popup window appears
Add Canal	Via menu; empty canal is created. Enter data via the edit-screen.
Delete Canal	Via menu
Check data	Via menu or button bar.

Editing possibilities in Popup:

Edit field	Directly typing into edit fields
Add line	Via menu
Duplicate line	Via menu
Delete line	Via menu
Check data	Via menu or button bar

Screenshots

SIWARE - [Canal System [sCurrentFile]]

File Edit Options Window Help

Main Menu [c] 1994 by DRI and SC-DLD

double-click on canal to Edit its data.

Use this grid to view complete file:

Node #	X-coor of node [km]	Y-coor of node [km]	Elevation [m amsl]	Code conn struct	# of conn struct	# of conn branch	node conn branch	Frac served	*
1	304.85	44.26	0.00	0	0	0	0	0.00	
2	304.68	71.41	0.00	0	0	0	0	0.00	
3	320.78	110.44	0.00	0	0	0	0	0.00	
4	317.55	131.76	0.00	2	30	2	32	0.00	
5	294.06	168.11	0.00	6	21	0	0	0.00	
6	265.98	199.91	0.00	0	0	0	0	0.00	
7	235.11	226.14	0.00	2	32	3	47	0.00	
8	193.34	258.48	0.00	1	40	0	0	0.00	
9	157.39	287.77	0.00	0	0	0	0	0.00	
10	121.47	322.38	0.00	6	8	0	0	0.00	
11	92.89	354.94	0.00	0	0	0	0	0.00	
12	69.42	397.13	0.00	0	0	0	0	0.00	
13	58.31	417.46	0.00	8	3	0	0	0.00	
14	49.50	440.07	0.00	0	0	0	0	0.00	
15	42.27	495.26	0.00	6	7	0	0	0.00	

03-11-1994

Canal [Untitled]

File Edit Options Help

Canal Number: 1 Canal Name: EEN

Node #	X-coor of node [km]	Y-coor of node [km]	Elevation [m amsl]	Code conn struct	# of conn struct	# of conn branch	node conn branch	Frac served	*
1	304.85	44.26	0.00	0	0	0	0	0.00	
2	304.68	71.41	0.00	0	0	0	0	0.00	
3	320.78	110.44	0.00	0	0	0	0	0.00	
4	317.55	131.76	0.00	2	30	2	32	0.00	
5	294.06	168.11	0.00	6	21	0	0	0.00	
6	265.98	199.91	0.00	0	0	0	0	0.00	

Ok Cancel

File: CRDVnn.TXT

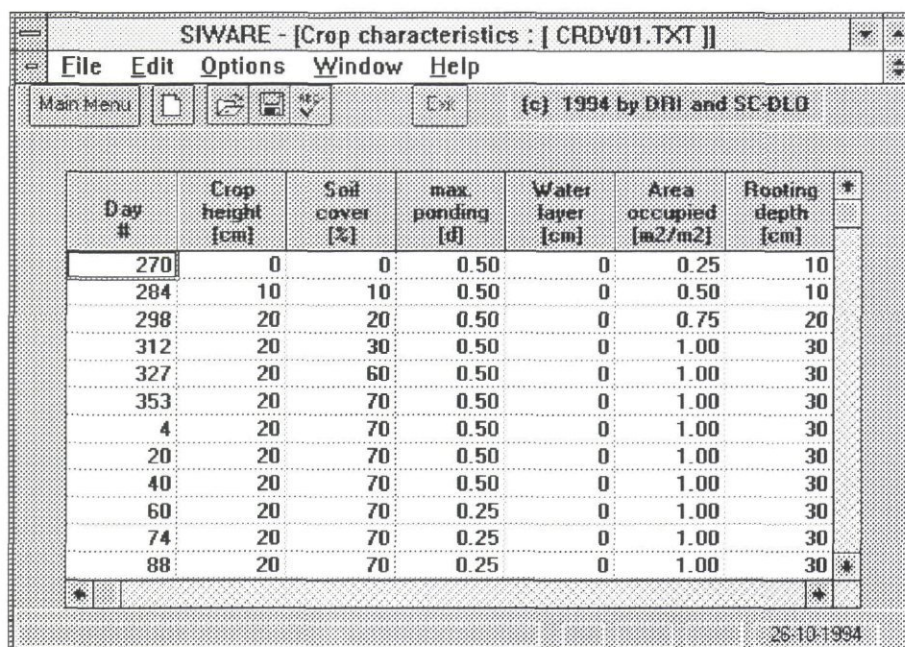
Description

The screen contained an editable grid with data. Data can be typed directly into the grid fields.

Editing possibilities in main window:

Edit Field	Typing directly into the grid
Add Line	Via menu
Delete Line	Via menu
Duplicate Line	Via menu
Check data	Via menu or button bar.

Screenshot



The screenshot displays the SIWARE software window titled "SIWARE - [Crop characteristics : [CRDV01.TXT]]". The menu bar includes File, Edit, Options, Window, and Help. Below the menu bar is a toolbar with icons for Main Menu, a file icon, a printer icon, a checkmark icon, and an exit icon. The status bar at the bottom indicates "(c) 1994 by DRI and SC-DLO" and the date "26-10-1994".

Day #	Crop height [cm]	Soil cover [%]	max. ponding [d]	Water layer [cm]	Area occupied [m2/m2]	Rooting depth [cm]	*
270	0	0	0.50	0	0.25	10	
284	10	10	0.50	0	0.50	10	
298	20	20	0.50	0	0.75	20	
312	20	30	0.50	0	1.00	30	
327	20	60	0.50	0	1.00	30	
353	20	70	0.50	0	1.00	30	
4	20	70	0.50	0	1.00	30	
20	20	70	0.50	0	1.00	30	
40	20	70	0.50	0	1.00	30	
60	20	70	0.25	0	1.00	30	
74	20	70	0.25	0	1.00	30	
88	20	70	0.25	0	1.00	30	*

File: CROPDUT.TXT

Description





This screen contains data in an editable grid. Values can be typed directly into the grid.

Note that there can be more data in a file/grid than shown on one screen. The grid can scroll left/right and up/down to show other data.

Editing possibilities in main window:

Check data Via menu or button bar.

Screenshot

SIWARE - [Cropdut.txt : [Cropdut.txt]]								*	*
File Edit Options Window Help									
Man Menu					Esc	(c) 1994 by DRI and SE-DLO			
Water duty per crop and per decade of days {m/decade of days}									
Decade	L-Berseem 1 Winter	Wheat 2 Winter	w-Vegetabl 3 Winter	Rice 4 Summer	Cotton 5 Summer	Maize 6 Summer	S-Veget 7 Early s	*	
1	0.029	0.031	0.061	0.000	0.000	0.000	0		
2	0.015	0.015	0.030	0.000	0.000	0.000	0		
3	0.000	0.000	0.000	0.000	0.000	0.000	0		
4	0.000	0.000	0.000	0.000	0.000	0.000	0		
5	0.029	0.014	0.025	0.000	0.000	0.000	0		
6	0.047	0.023	0.040	0.000	0.000	0.000	0		
7	0.058	0.029	0.050	0.000	0.000	0.000	0		
8	0.055	0.028	0.028	0.000	0.013	0.000	0		
9	0.057	0.029	0.007	0.000	0.029	0.000	0		
10	0.052	0.027	0.007	0.000	0.027	0.000	0		
11	0.055	0.026	0.003	0.000	0.026	0.000	0		
12	0.059	0.026	0.000	0.000	0.026	0.000	0	*	
*								*	
26-10-1994									

File: CRPCHR.TXT

Description

The main window contains a grid with the data per crop. Data will be edited using popup windows.

The farmers preference numbers will be edited in an editable popup by double clicking on a field in the main grid.

The preference numbers for crop succession will be edited in a multi-select window (see screen-print).

In the multi-select window, data must be selected by transferring it from the left list (select from) to the right list (selected).

The left list will only contain the valid selections. The preferences can further be ordered by moving selected crops up and down in the list with the buttons under the right list.

NB: Users without a mouse can still press the buttons by moving the focus through the popup-window with the tab-key, or using the alt-keys with the underlined shortcut-characters. For example: in the figure below, the focus is on "Maize", pressing Alt-U will move this crop upwards in the list.

NB: If possible, the editing of values will be disabled so no data is entered directly into the grid. This prevents entering of incorrect data.

NB: The possibility of using the drag and drop feature to transfer data between the lists will be investigated.

Editing possibilities in main window:

Farmers pref.	Double clicking or enter displays editable popup, then typing directly in the gridcell
Crop Seq.	Via double click or enter on a gridcell; popup window appears
Check data	Via menu or button bar.

Editing possibilities in sequence popup:

Left	Button ">"
All left	Button ">>"
Right	Button "<"
All right	Button "<<"
Up	Button or Alt-U
Down	Button or Alt-D
Accept	Button "Ok" or Alt-O
Discard	Button "Cancel" or Alt-C

Editing possibilities in irr. pref. popup

Edit Field	Typing directly into grid cell
------------	--------------------------------

Screenshots

SIWARE - [Crop characteristics : [CRPCHR.TXT]]																			
File Edit Options Window Help																			
Main Menu						[c] 1994 by DRI and SC-DLO													
Crop No	Crop Name	Critical Leaf Potential	Irrigation Preference	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	*
1	L-Berseem	7.0	6	0	0	0	8	5	7	6	6	0	0	0	9	0	0	0	
2	Wheat	10.0	5	0	0	0	7	5	8	6	0	0	0	0	9	0	0	0	
3	W-Vegetabl	5.0	4	0	0	0	7	8	5	6	0	0	0	0	9	0	0	0	
4	Rice	5.0	7	0	0	0	6	5	7	8	0	0	0	0	9	0	0	0	
5	Cotton	13.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	Maize	7.0	11	7	5	8	0	0	0	0	0	0	6	9	0	0	0	0	
7	S-Vegetabl	5.0	12	7	8	6	0	0	0	0	0	0	5	9	0	0	0	0	
8	Trees	10.0	8	6	5	7	0	0	0	0	0	0	8	9	0	0	0	0	
9	Sugar beet	7.0	0	8	6	7	0	0	0	0	0	0	5	9	0	0	0	0	
10	S-Berseem	7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11	W-Fallow	16.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	S-Fallow	16.0	1	6	7	8	0	0	0	0	0	0	9	5	0	0	0	0	
13	Nili Vegg	5.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14	Sprinkler	7.0	2	0	0	0	7	6	8	9	0	0	0	0	5	0	0	0	
15	Surface	10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*
*																			*
26-10-1994																			

Irr. Preference	
File Edit Options Help	
farmers irrigation preference	
L-Berseem	6
Wheat	5
W-Vegetabl	4
Rice	7
Cotton	0
Maize	11
S-Vegetabl	12
Trees	8
Sugar beet	0
S-Berseem	0
W-Fallow	0
S-Fallow	1
Nili Vegg	0
Sprinkler	2
Surface	0
Ok Cancel	

Select

Select preferences for crops to precede S-Berseem

-> Select From : List of possible crops to precede S-Berseem

-> Selected : List of selected crops to precede S-Berseem in order of

Select from

6 Maize

>

>>

<

<<

Selected

4 Rice

7 S-Vegetabl

12 S-Fallow

5 Cotton

Up

Down

Ok

Cancel

B-8 Expert Users' Interface for SIWARE

Files: DISRULE.TXT, GENERAL.TXT, GENINP.ext4

Description

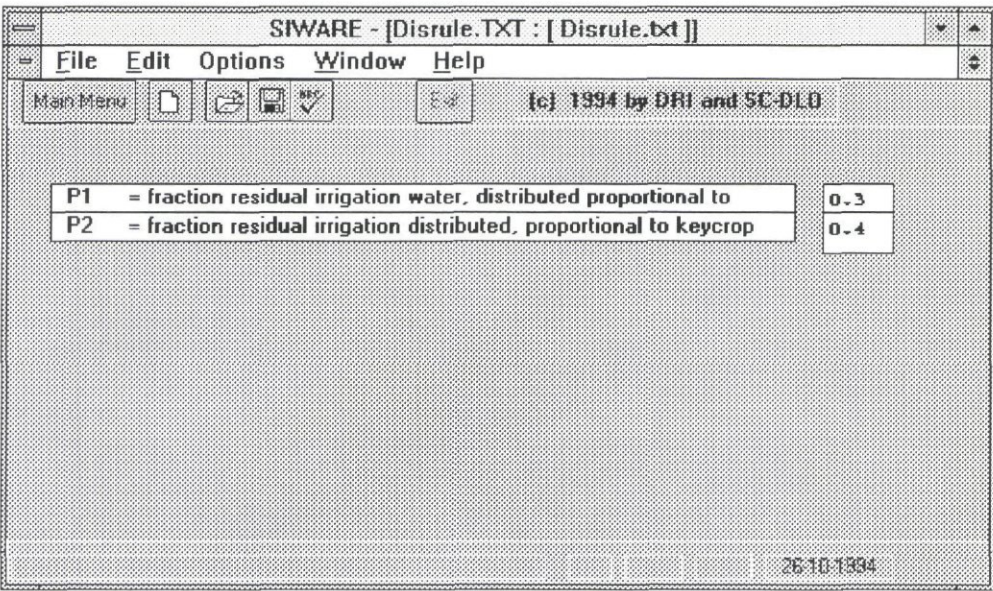
These files are all edited in similar windows, a list of prompts and editable textboxes. The user can use a mouse or the tab-key to move from one text-box to another.

Using the help-option from the menu or pressing F1 on a particular item results in a help-screen for that item. An example of this is shown in the second figure, where the user asked for help on an item in GENERAL.TXT.

Editing possibilities in main window:






- Values Typing in text-box.
- Check data Via menu or button bar.

Screenshots



SIWARE - [General.TXT : [General.txt]]

File Edit Options Window Help






Main Menu      Exit (c) 1994 by DRI and SC-DLO

FPERM	factor to calculate average conductivity of cracked soils.	20.000
CREF	factor for leaching efficiency of a saturated soil.	1.000
FSTDR	fast drainage rice fields.	1.000
ANISO	anisotropy subsoil.	25.000
BASRES	basic resistance leakage [d].	250.000
CHLNILE	average chloride content of fresh irrigation water [Meq/l].	0.500
FRACU	maximun fraction external drain water.	3.000
FRAC1	maximun fraction internal drain water.	1.100
FRAC2	maximum fraction of area with access to drainage.	-0.100
OVERIRR	extra water needed for leaching.	0.000

26-10-1994

SIWARE - [GENINP.Ex44 : [GENINP.00]]

File Edit Options Window Help

Main Menu      Exit (c) 1994 by DRI and SC-DLO

OPRLOSS	factor to account for operational losses [-]	2.00
SIDESLP	side-slope of irrigation canals [m/m]	3.00
QMAXSAK	max. capacity major irrigation tools [m3/s]	0.05
QMAXPUM	max. capacity additional irrigation tools [m3/s]	0.10
FRACSAK	fraction of the study area served by sakkias [-]	0.50
FRACPUM	fraction of the study area served by pumps [-]	0.50

Exit the program Num 14-03-1995

File: GRWUSE.TXT

Description

This screen contains data in an editable grid. Values can be typed directly into the grid. The first column of the grid is non-editable.

Note that there can be more data in a file/grid than shown on one screen. The grid can scroll up/down to show more data.

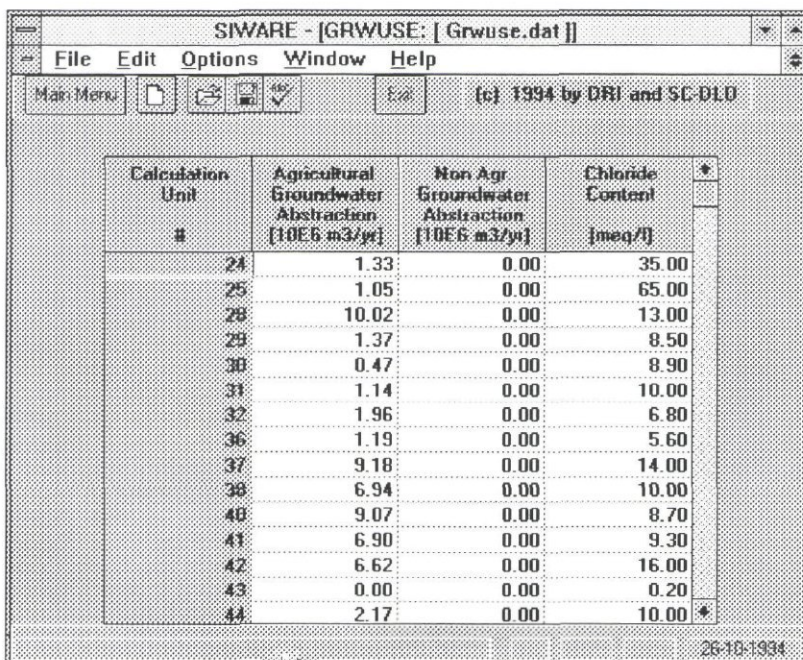
Note: In the final version, two columns for groundwater abstraction will be needed, one for agricultural use and one for non-agricultural use. This change is not yet visible in the accompanying figure.

Editing possibilities:

Values	Typing directly into the grid fields.
Add units	Via menu
Delete units	Via menu
Check data	Via menu or button bar.

Note: Adding/deleting calculation units can only be done by appending/removing new units at the bottom of the list/file since the record number must correspond with the calc.unit number. Adding will be done by asking how many units (records) he/she wants to add and then extending the list with this number of items.

Screenshot



The screenshot displays the SIWARE software interface with the file 'GRWUSE: [Grwuse.dat]' open. The menu bar includes File, Edit, Options, Window, and Help. Below the menu bar is a toolbar with icons for Main Menu, a folder, a document, a checkmark, and a button labeled 'E/A'. The copyright notice '(c) 1994 by DRI and SC-DLO' is visible. The main data grid has four columns: Calculation Unit #, Agricultural Groundwater Abstraction [10E6 m3/yr], Non Agr Groundwater Abstraction [10E6 m3/yr], and Chloride Content [meq/l]. The grid contains 17 rows of data, with the last row (44) highlighted. The status bar at the bottom right shows '26-10-1994'.

Calculation Unit #	Agricultural Groundwater Abstraction [10E6 m3/yr]	Non Agr Groundwater Abstraction [10E6 m3/yr]	Chloride Content [meq/l]
24	1.33	0.00	35.00
25	1.05	0.00	65.00
28	10.02	0.00	13.00
29	1.37	0.00	8.50
30	0.47	0.00	8.90
31	1.14	0.00	10.00
32	1.96	0.00	6.80
36	1.19	0.00	5.60
37	9.18	0.00	14.00
38	6.94	0.00	10.00
40	9.07	0.00	8.70
41	6.90	0.00	9.30
42	6.62	0.00	16.00
43	0.00	0.00	0.20
44	2.17	0.00	10.00

File: HDext2.TXT

Description

This screen contains data in an editable grid. Values can be typed directly into the grid.





Note that there can be more data in a file/grid than shown on one screen. The grid can scroll left/right and up/down to show other data.

Editing possibilities:

Add Lines	Via menu.
Delete Last Line	Via menu
Check Current Line	Via menu.
Check all data	Via menu or button.
Edit data	Typing directly into grid field

Note: Adding/deleting calculation units can only be done by appending/removing new units at the bottom of the list/file since the record number must correspond with the calc.unit number. Adding will be done by asking how many units (records) the user wants to add and then extending the list with this number of items.

Screenshots

SIWARE - [Hydrological characteristics : [HD77.TXT]]								
File Edit Options Window Help								
Main Menu					[c] 1994 by DRI and SC-DLD			
				Exit				
calculation unit number	code for climatic region	on-farm irrigation eff. code	soil code	area calculation unit [km2]	fraction cultivated area [-]	permeability [m/d]	dram spacing [m]	d d
1	SI	E1	5	58.0	0.88	0.25	375.0	
2	SI	E1	5	94.1	0.88	0.25	375.0	
3	SI	E1	5	101.0	0.88	0.25	375.0	
4	SI	E1	5	69.6	0.88	0.25	375.0	
5	SI	E1	5	34.2	0.88	0.25	375.0	
6	SI	E1	5	82.0	0.88	0.25	375.0	
7	SI	E1	5	147.3	0.88	0.25	375.0	
8	SI	E1	5	69.7	0.88	0.25	375.0	
9	SI	E1	0	103.7	0.88	0.25	375.0	
10	SI	E1	5	49.6	0.91	0.25	375.0	
11	SI	E1	5	49.1	0.91	0.25	375.0	
12	SI	E1	5	136.4	0.88	0.25	375.0	
13	SI	E1	5	128.0	0.90	0.25	375.0	
14	SI	E1	79	57.3	0.90	0.25	375.0	
15	SI	E1	5	118.9	0.91	0.25	375.0	
16	SI	E1	5	119.3	0.91	0.25	375.0	
17	SI	E1	5	164.4	0.91	0.25	375.0	
18	SI	E1	5	88.1	0.90	0.25	375.0	
19	SI	E1	5	99.9	0.90	0.25	375.0	
20	SI	E1	5	122.1	0.88	0.25	375.0	
Double click on grid row to get editable pop-up								
26-10-1994								

File Edit Options Help

Calculation Unit Nr : 6

code for climatic region	SI	*
on-farm irrigation eff. code	E1	*
unit code	5	
area calculation unit [km2]	82.0	
fraction cultivated area [-]	0.88	
permeability [m/d]	0.25	
drain spacing [m]	375.0	
drain depth [m]	1.25	
radial drain resistance [d]	3.0	
resistance clay cap [d]	250.0	
resistance puddled layer [d]	100.0	
aquifer pressure [m]	-6.25	
chloride conc. deep aquifer [Meq/l]	49.0	
thickness clay cap [m]	0	
fraction area with non off. reuse [-]	0	
allowed rice percentage [-]	0	
infiltration capacity [m/d]	0.00	
thickness drain aquifer [m]	93.75	
apparent drain spacing [m]	375.0	
apparent drain depth [m]	1.3	

Ok Cancel

File: INTIDI.TXT

Description

This screen contains data in an editable grid. Values can be typed directly into the grid.

Note that there can be more data in a file/grid than shown on one screen. The grid can scroll left/right and up/down to show more data. When scrolling left/right, the first column (time) remains fixed to provide information.

Editing possibilities in popup:

- Edit field Typing directly into grid cells.
- Add line Via menu.
- Duplicate line Via menu.
- Delete line Via menu.
- Check data Via menu or button bar.

Screenshot

The screenshot shows a window titled "SIWARE - [INTIDI.TXT : [Intidi.txt]]". The menu bar includes "File", "Edit", "Options", "Window", and "Help". Below the menu bar is a toolbar with icons for "Main Menu", a grid icon, a save icon, a print icon, and an "Exit" button. A copyright notice "(c) 1994 by DBI and SE-DLO" is visible. The main area contains a table with the following data:

Time Moment [Hr]	Winter relative capacity	Winter Gate adjustm.	Summer relative capacity	Summer Gate adjustm.	Spr/Aut relative capacity	Spr/Aut Gate adjustm.	*
2	0.1	0	0.4	0	0.2	0	
4	0.1	0	0.4	0	0.2	0	
6	0.1	0	0.7	0	0.4	0	
8	0.5	0	1.0	0	0.7	0	
10	1.0	1	0.9	1	1.0	1	
12	0.8	0	0.8	0	0.8	0	
14	0.6	0	0.6	0	0.8	0	
16	0.4	0	0.7	0	0.6	0	
18	0.4	1	0.8	1	0.6	1	
20	0.2	0	0.7	0	0.4	0	
22	0.2	0	0.6	0	0.2	0	
24	0.2	0	0.5	0	0.2	0	

At the bottom right of the window, the date "26-10-1994" is displayed.

File: INTIPU.ext4

Description

The main screen contains one grid. The grid contains only the Pump number, pump type, region and pump name. Double clicking on this grid starts the popup-edit window.

The popup window allows editing of the data for one pump by directly typing into the grid. Pump nr, pump type, region and name cannot be edited : they are defined in the file PUMP.DEF.

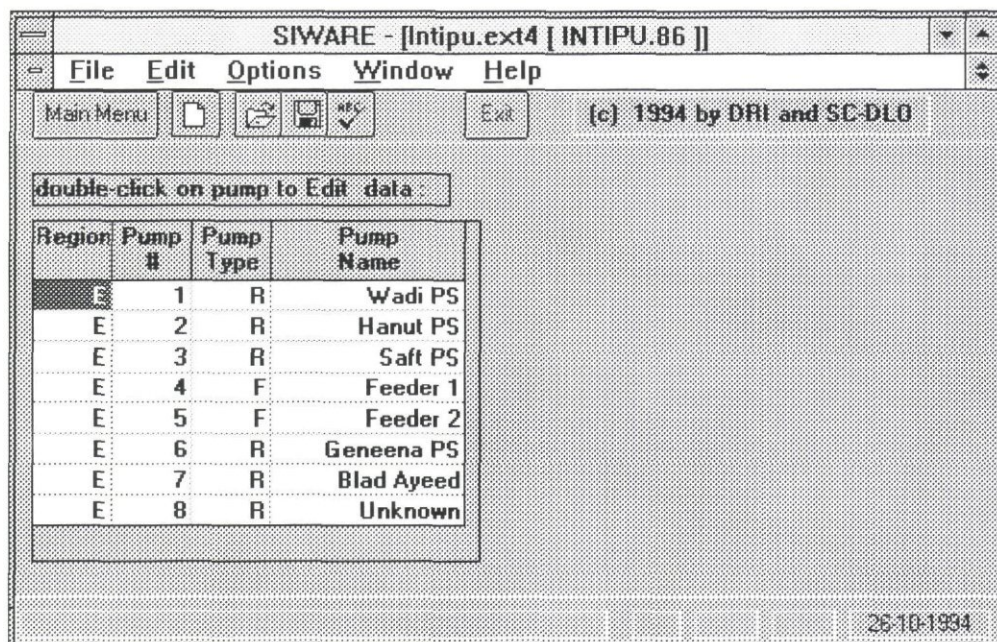
Editing possibilities in main window:

Edit Pump	Via menu or double click; popup window appears
Check data	Via menu or button bar.

Editing possibilities in Popup:

Edit field	Directly typeing into a grid field
Check data	Via menu or button bar
Save changes	Via menu "Save" or OK-button
Cancel edit	Via menu "Close" or Cancel button.

Screenshots



Edit Pump

File Edit Options Help

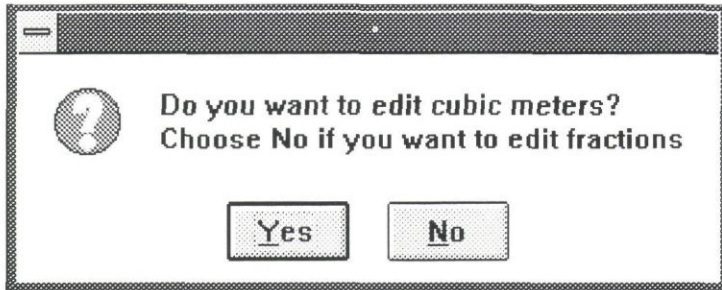
Region Pump Nr Pump Type

Pump Name

Month	Var1 [.]	Var2 [m3/s]	Chloride Concentration [Meq/l]
1	0.00	2.20	3.00
2	0.00	1.70	3.30
3	0.00	1.70	2.90
4	0.00	1.60	2.90
5	0.00	1.50	2.70
6	0.00	2.00	3.50
7	0.00	2.30	2.50
8	0.00	2.40	3.00
9	0.00	2.00	3.30
10	0.00	1.20	3.40
11	0.00	1.70	3.40
12	0.00	2.20	3.40

File: IRQUAN.ext4

Before entering the edit screen you have to choose whether you want to edit cubic meters or fractions:



After you have chosen an edit option the edit screen appears.

Description

The screen contains text-boxes, option buttons and an editable grid.

When an other option is chosen (e.g. Month), the title of the grid should be altered.

Creating a "New" file should always start with 36 decades. The user can indicate that he wants to enter monthly data by choosing the "Month" option.

When the option "Year" is chosen, the grid will be hidden (editing of values no longer relevant) and the value stored should be "1.000"

Note: The number of timesteps can only be reduced, whereby the values will be aggregated. E.g. when twelve timesteps are entered, the option "Decades" will not be active.

The directly editable grid enables the user to edit for every time step (month or 10-daily decade) depending on the choice the user made when opening the file. With the "Update" button the column that is not edited (cubic meters or fractions) will be updated.

Editing possibilities:

Values	Via text-boxes or typing directly into gridcells
Check data	Via menu or button bar.
Number of timesteps	Via option button.

Screenshot

SIWARE - [IRQUAN.Ex14 : [IRQUAN.00]]

File Edit Options Window Help

Main Menu [Icons] Exit (c) 1994 by DRI and SC-DLO

Total Water Quantity : [10E6 m3] 2500.000

Average Chloride Conc. : [Meq/l] 1.20

Number of timesteps :

1 Year ☐

12 Months ☐

36 Decades ☒

Update

Edit Fractions

Decade #	Fraction	10E6 (m3)	+
1	0.021	53	
2	0.025	63	
3	0.005	13	
4	0.005	13	
5	0.026	65	
6	0.018	45	
7	0.025	63	
8	0.022	55	
9	0.025	63	
10	0.027	67	
11	0.027	67	
12	0.025	63	+

Num 28-02-1995

Files: MARKAZ.nn and MARKAZ.Rnn

Description

These screens contains a large grid with all data from MARKAZ.nn in it. Data can only be viewed. Editing takes place per markaz in a popup-window. In the popup, data can be typed directly into the gridcells.

The editing of MARKAZ.Rnn will take place in the same type of screens, but the area will be expressed in relative numbers [0..1] per crop, and only the first fifteen crops will be used.

In both cases, the "New" operation will result in a grid with crop and markaz data filled in (read from markaz.def and crop.def), but with area-data set to zero. Through the "New" option, the user can choose to include the markazes of a specific region (E,M,W) or all markazes.

Editing possibilities in main window:

Edit Current line	Via menu or double click; popup window appears.
Check Current line	Via menu.
Check all data	Via menu or button bar.






Editing possibilities in Popup:

Edit field	Typing directly into the grid
Check Data	Via menu
Save changes	Via menu "Save" or OK-button
Cancel edit	Via menu "Close" or Cancel button.

Screenshots

SIWARE - [Crop pattern : [MARKAZ.00]]

File Edit Options Window Help

Main Menu      Exit [c] 1994 by DRI and SC DLD

Comment :

Markaz Name	Reg	Nr	Tot area	1-Barseem	5-Barseem	Wheat	W-Vegetabl	Sugar beet	S-Veg
				1	2	3	4	5	
				Winter	Winter	Winter	Winter	Winter	Early s
1st Mkrz	E	3	1000	100	100	0	50	0	
2nd Mkrz	E	2	0	0	0	0	0	0	
1st M Mkrz	M	1	1000	0	100	100	0	50	
2nd M Mkrz	M	2	0	0	0	0	0	0	
45th Mkrz	W	45	0	0	0	0	0	0	

26-10-1994

Edit Markaz Crop Areas

File Edit Options Help

Markaz : 1st Mkrz (E3)

Net Agricultural area [Feddan] : 1000

Crop	Type	Area
1-Barseem	{Winter}	100
5-Barseem	{Winter}	100
Wheat	{Winter}	0
W-Vegetabl	{Winter}	50
Sugar beet	{Winter}	0
S-Vegetabl	{Early_summ}	0
Rice	{Summer}	150
Cotton	{Summer}	0
Maize	{Summer}	150
Mlt Vags	{Nile}	0
Trees	{Perennial}	800
Sprinkler	{Perennial}	0
Surface	{Perennial}	0
W-Fallow	{Winter}	0
S-Fallow	{Summer}	0
Fall	{Winter}	0
Bades	{Winter}	0

Ok Cancel

SIWARE - [Relative Crop pattern : [MARKAZ.R00]]

File Edit Options Window Help

Man Menu [Icons] [c] 1994 by DRI and SC-DLO

Comment : [Text Box]

Markaz Name	Reg	Nr	Tot. area	L-Berseem	S-Berseem	Wheat	W-Vegetabl	Sugar beet	S-Veg
				1	2	3	4	5	
				Winter	Winter	Winter	Winter	Winter	Early
1st Mkrz	E	3	1000	40.11	0	0	0	0	
2nd Mkrz	E	2	1000	0.00	0	0	0	0	
1st M Mkrz	M	1	0	0	0	0	0	0	
2nd M Mkrz	M	2	0	0	0	0	0	0	
45th Mkrz	W	45	0	0	0	0	0	0	

2E-10-1994

Edit Markaz Crop Areas

File Edit Options Help

Markaz : 1st Mkrz (E3)

Net Agricultural area [Feddan] : 1000

Crop	[type]	Area
S-Berseem	[Winter]	0
Wheat	[Winter]	0
W-Vegetabl	[Winter]	0
Sugar beet	[Winter]	0
S-Vegetabl	[Early_summ]	30.11
Rice	[Summer]	10
Cotton	[Summer]	0
Maize	[Summer]	0
Nat Vegg	[Nat]	31
Trees	[Perennial]	39.89
Sprinkler	[Perennial]	0
Surface	[Perennial]	0
W-Fallow	[Winter]	20
S-Fallow	[Summer]	20

Ok Cancel

File: NAGRUS.ext4

Description

Editable grid. Values can be typed directly into the grid.

Note: Checking of data is only partly done in the interface program. A more elaborated check will be done by external programs (see notes with file description).

Note: Creating a completely new file is not advised. User should preferably make a copy of an existing file.

Editing possibilities:

Values	Editing directly into grid cells.
Add line	Via menu.
Duplicate line	Via menu
Delete line	Via menu
Check data	Via menu or button bar.

Screenshot

Irrigation canal node #	Supply rate [m3/s]	Drainage section # for sewage	Chloride sewage [meq/l]	*
2	-3.00	40	4.00	
13	0.15	-1	-1.00	
25	0.04	-1	-1.00	
32	-5.00	41	4.00	
39	0.30	-1	-1.00	
52	0.15	-1	-1.00	
68	0.15	-1	-1.00	

File: PDreg.TXT

Description

Editable grid. Number of crops is fixed (contents of crop.def, only aggregated crop).

Editing possibilities in main window:

Edit field Typing directly into the grid cell

Check data Via menu or button bar.

Screenshot

SIWARE - [PDreg.TXT : [PDE1.TXT]]								
File Edit Options Window Help								
Main Menu						(c) 1994 by DRI and SC-DLO		
Crop	Plot Length [m]	Plot Width [m]	Plot Slope [m/m]	Manning Coeff. s/m0.33	Wetted area [m/m2]	on farm losses [m3/d]	Capacity irr. tool [m3/s]	Drainage Pipes Closed?
1 - L-Berseem	20.0	20.0	0.0005	0.150	1.000	40.0	0.02	N
2 - Wheat	20.0	20.0	0.0005	0.100	0.800	40.0	0.02	N
3 - W-Vegetabl	10.0	10.0	0.0005	0.100	0.600	40.0	0.02	N
4 - Rice	20.0	20.0	0.0005	0.150	1.000	40.0	0.02	N
5 - Cotton	10.0	10.0	0.0005	0.040	0.500	40.0	0.02	N
6 - Maize	20.0	20.0	0.0005	0.100	0.800	40.0	0.02	N
7 - S-Vegetabl	10.0	10.0	0.0005	0.100	0.600	40.0	0.02	N
8 - Trees	10.0	10.0	0.0005	0.040	0.500	40.0	0.02	N
9 - Sugar beet	40.0	40.0	0.0005	0.150	1.000	40.0	0.02	N
10 - S-Berseem	20.0	20.0	0.0005	0.150	1.000	40.0	0.02	N
26-10-1994								

File: PERIOD.TXT

Description

The window contains a grid that can be edited through typing directly into grid fields.

The so called combo-boxes present the user with a drop-down list of valid choices for each option. However, the user is free to enter other values than those presented in the list (warning may follow, but can be ignored).

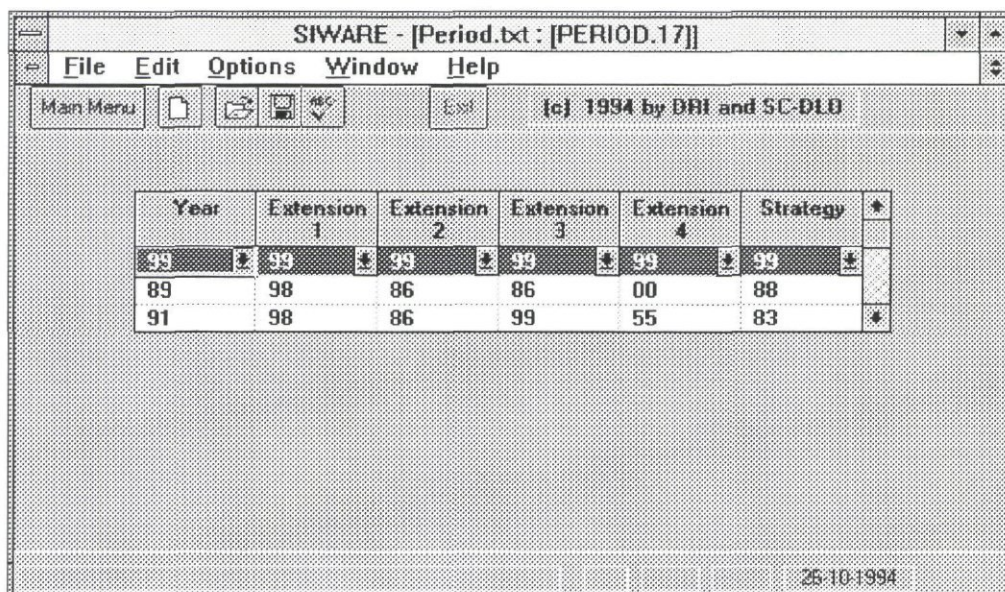
Remark:

when a check is done, the file check window (see figure below) appears, showing the files needed to run the models with this PERIOD.TXT. The files that are on the run directory are checked, missing files are not. For a more detailed description, refer to chapter 3 of this document.

Editing possibilities in main window:

Edit line	Typing directly into the grid or choosing a value from the combobox.
Add line	Via menu.
Duplicate line	Via menu.
Delete line	Via menu.
Check data	Via menu or button bar.

Screenshots



CheckList for Files

Refer to Help for detailed information

FileName	Auto	Manual	*
CD86.TXT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CD99.TXT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CNSYST.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CNSYST.55	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CNSYST.99	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CRDV01.TXT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRDV02.TXT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRDV03.TXT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRDV04.TXT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRDV05.TXT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRDV06.TXT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRDV07.TXT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRDV08.TXT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRDV09.TXT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CRDV10.TXT	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Close

File: REUSE.SEL

Description

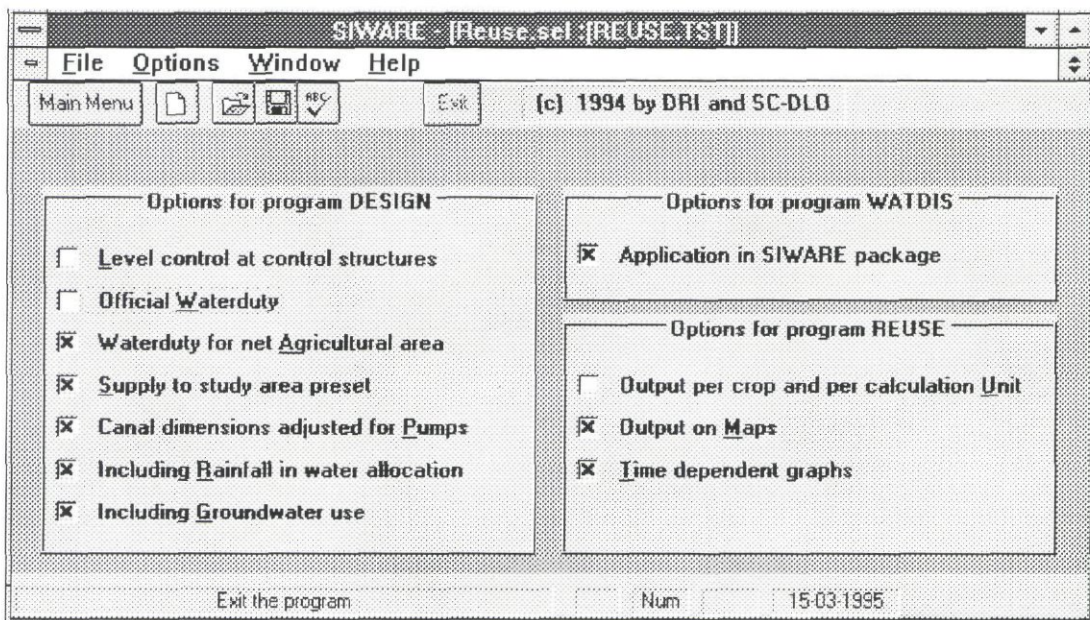
Screen with option-buttons. User only has to fill in yes/no options.

Editing possibilities in main window:

Edit data By checking the option buttons

Check data Via menu or button bar.

Screenshot



File: SECTION.ext4

Description

Editable grid.

The first column of the grid will be frozen so that it remains visible when horizontal scrolling occurs.

Note: data is only checked on ranges. More elaborate checking must take place with other programs (CHECKER and NEWTESTC)

Editing possibilities in main window:

- Edit field Typing directly into the field
- Add line Via menu.
- Duplicate line Via menu
- Delete line Via menu
- Check data Via menu or button bar.

Screenshot

SIWARE - [SECTION.ext1 : [SECTION.B8]]									
File Edit Options Window Help									
Main Menu									
(c) 1994 by DBI and SC-DLO									
Section #	Previous section #	Next section #	Previous simul section	Next simul section	Simul level	Calc unit #	Section # branch canal	Section # non-olf reuse	*
12	11	13	0	13	1	57	-1	-1	
13	12	14	0	36	1	-1	-1	-1	
14	13	15	-1	41	2	-1	38	-1	
15	14	16	-1	16	3	68	-1	-1	
16	15	17	0	17	3	-1	42	-1	
17	16	18	0	18	3	69	-1	-1	
18	17	43	0	43	3	58	-1	-1	
43	18	19	0	126	3	82	-1	-1	
19	43	20	-1	44	4	52	-1	-1	
20	19	21	0	21	4	-1	45	-1	
21	20	22	0	22	4	-1	-1	-1	
22	21	23	0	23	4	-1	-1	-1	
23	22	24	0	46	4	-1	-1	-1	*

File: SOILS.TXT

Description

The main window consists of a non-editable grid with data. Editing takes place per soil in a popup-window.

A "New" operation results in a grid with only the soil-names filled in, read from soils.def. The user must supply the other data.

Editing possibilities in main window:

- Edit current line Via menu or double click; popup window appears
- Check current line Via menu
- Check all data Via menu or via button-bar

Editing possibilities in Popup:

- Edit field Typing directly into the grid
- Check data Via menu.
- Save changes Via menu "Save" or OK-button
- Cancel edit Via menu "Close" or Cancel button.

Screenshots

SIWARE - [Soil characteristics : [SOILS.TXT]]						
File Edit Options Window Help						
Main Menu [Icons] [c] 1994 by DRI and SC-DLO						
soil name	soil code	minimum dry bulk density [kg/m3]	m.c. at saturation [m3/m3]	m.c. at field capacity [m3/m3]	m.c. at wilting point [m3/m3]	slope of func. [dr. db. m. [kg/m3]
basin clay	1	1000	0.540	0.519	0.321	-20
silty clay	2	1000	0.507	0.463	0.257	-15
silty clay loam	3	1200	0.475	0.372	0.185	-5
clay loam	4	1200	0.445	0.406	0.242	-9
sandy clay loam	5	1400	0.432	0.290	0.140	-5
loam	6	1300	0.503	0.420	0.098	-1
silt loam	7	1300	0.509	0.461	0.092	
sandy loam	8	1300	0.465	0.260	0.061	
loamy fine sand	9	1300	0.439	0.179	0.060	
medium fine sand	10	1400	0.350	0.155	0.023	
26-10-1994						

Edit Soil Characteristics

File Edit Options Help

Soil : silty clay

unit weight	2
minimum dry bulk density [kg/m3]	1000
m.c. at saturation [m3/m3]	0.507
m.c. at field capacity [m3/m3]	0.463
m.c. at wilting point [m3/m3]	0.257
slope of func (d.d.b., m.c.) [kg/m3]	-1500
a1 in max. capillary flux funct [-]	0.000950
a2 in max. capillary flux funct [-]	0.004060
a3 in max. capillary flux funct [-]	0.013800
b1 in max. capillary flux funct [-]	0.392000
b2 in max. capillary flux funct [-]	1.700000
b3 in max. capillary flux funct [-]	4.290000
thickness cap. layer bel. rootz. [m]	0.500
(vertical) permeability [m/d]	0.075
diffusivity [cm2/d]	6.00

Ok Cancel