TROFOLIN DATABASE
USER MANUAL

L. Touber, Y. van Randen and N. Gijsen

June 1993

DLO Winand Staring Centre for Integrated Land, Soil and Water Research
P.O. Box 125, NL - 6700 AC Wageningen, The Netherlands
Phone: + 31.8370.74200 Fax: + 31.8370.24812

sc-dlo

Report prepared for the TROPENBOS Foundation,
P.O.Box 232
NL - 6700 AE Wageningen, The Netherlands

CONTENTS

1 INTRODUCTION

The TROFOLIN DATABASE (TROpical FOrest Land INventory) has been developed in the framework of the Tropenbos Programme. One of the aims of this programme is the development of common methodologies for inventory and evaluation of humid tropical forest land. In order to promote the comparability of the results of land inventories conducted at various sites, the Tropenbos Technical Series 4: 'Inventory and evaluation of tropical forest lands - Guidelines for a common methodology' (Touber et al, 1989) was issued. These guidelines describe methods for tropical forest land inventories of physical and biotic data at reconnaissance level.

In the course of the Tropenbos Programme many data from various research sites have become available, and many more will follow. The use of information technology is indispensable for the storage and processing of these data. To maintain comparability of data and results from different research sites, it was decided to develop a standard database for storage of physical and biotic data at the individual sites.

The database development was carried out by QRay Agrimathica, Veenendaal in cooperation with the Winand Staring Centre, Wageningen, with financial support from the Tropenbos Foundation, Wageningen. The datamodel that underlies the database is described in the Winand Staring Centre Report 'Datamodel for tropical forest land inventory at reconnaissance level' (Gesink et al, 1990), which, in turn, was based on the Tropenbos Technical Series 4 (Touber et al, 1989).

In the development schedule of the database, a field testing phase was included, in which the prototype database was tested at the individual research sites. The results of this testing phase were incorporated.

The present TROFOLIN Database User Manual provides guidelines on the installation of the database at the user's Personal Computer as well as a step by step explanation on its actual functions, options and operation. In addition, the manual offers some guidelines to work with TROFOLIN data through the database package dBASE (versions III or IV, Ashton Tate).

In its final form, the TROFOLIN database is primarily a tool for the storage of data. Manipulation and selection of data is not possible within TROFOLIN, but can be carried out with dBASE, with which the TROFOLIN data files are fully compatible.

2 INSTALLATION OF TROFOLIN

TROFOLIN requires the following hardware and software:

- a Personal Computer with MS-DOS, PC-DOS or DR-DOS;
- 640 KB internal memory (512 KB is also possible but the speed will be lower);
- a Hard Disk with at least 2 MB free;
- Hercules, VGA, CGA or EGA graphics card;
- files = 30 or more (in config.sys);
- parallel printer.

Installation of TROFOLIN on the hard disk:

- Insert the installation disk into drive A (or B).
- Type **A:** (or **B:**) and press <enter>.
- Type **install A:** (or **B:**) **C:** and press <enter>.

TROFOLIN will now be installed on the hard disk. The system files are located in a TROFOLIN directory, while the data files are installed in a subdirectory TROFOLIN\DATA.

CAUTION: *KEEP ALWAYS A BACKUP OF BOTH SYSTEM AND DATA FILES.*

NOTE: *If any problem with the installation is encountered, please contact:*
W. Andriesse,
A.K. Bregt or,
Y. van Randen
of the Winand Staring Centre

Phone 31.8370.74200
Fax 31.8370.24812
Telex 75230 visi-nl

3 THE TROFOLIN APPLICATION

3.1 Getting started

Follow these steps to start TROFOLIN:

- Type **CD TROFOLIN** at the C:> prompt and press <enter>.
- The TROFOLIN directory is now active. The programme is started by typing **TROFOLIN** and pressing <enter>.

The main menu will appear on the screen (Figure 1). This menu contains six options, which can be selected with the cursor keys or by striking their first letter. The INFO option provides general information about TROFOLIN and has no operational function. The other options of the main menu will be discussed in the chapters that follow.

Figure 1 Main menu TROFOLIN

3.2 Terminology

A short explanation of the terminology used in the manual and on the screen is given here, before the various options within the main menu will be discussed.

Entity	A number of interrelated data belonging to the same object. In TROFOLIN an entity is represented by a table.
Attribute	A property describing an aspect of an entity.
Key attribute	The attribute which is used to identify the relations between entities. Key attributes are essential for proper storage, extraction and linkage of data.
Record	Data 'line' in the table (or entity). Each record consists of smaller elements (fields).
1-1 relation	A record in entity A is only related to one record in entity B.
1-n relation	A record in entity A can be related to one or more records in entity B.
Default	Standard value provided by the TROFOLIN application.
Index	Records in TROFOLIN are ordered alphabetically, chronologically or numerically to increase the programme performance.
Pick list	List of possible values provided by the programme from which you can choose a value.
Packing	Permanent removal of records marked for deletion.

3.3 Screens and navigation

In the Trofolin application four different screens can be distinguished:

- Menu screen;
- Input and edit screen;
- Browse screen.
- Pick list

3.3.1 Menu screen

The menu screen is used for selection of the different options of the Trofolin application.

Table 1 Navigation in menu screen

Key	**Action**
Right arrow → or ctrl D	Move to next menu option
Left arrow ← or ctrl S	Move to previous menu option
Enter ↵	Select menu option
First letter of menu option	Select menu option
Esc	Go back to higher menu level

3.3.2 Input and edit screen

The input and edit screen is used for entering and editing of data. The input and edit screen appears only in the database menu option.

Table 2 Navigation in input and edit screen

Key	**Action**
Right arrow → or ctrl S	Move to next character
Left arrow ← or ctrl D	Move to previous character
Down arrow ↓	Move one field down
Up arrow ↑	Move one record up
Ctrl right arrow →	Move to previous word (remark attribute)
Ctrl left arrow ←	Move to next word (remark attribute)
Page down	Move one screen down
Page up	Move one screen up
Home or ctrl A	Go to first character
End or ctrl F	Go to last character
Del or ctrl G	Delete character at cursor position
Backspace or ctrl H	Delete character left of cursor position
Ctrl T	Delete word right

Table 2, continued

Key	Action
Ctrl Y	Delete from cursor to right
Ins or ctrl V	Insert mode
Enter ↵	Commit
Esc	Exit without changes
F10	Save

3.3.3 Browse screen

The browse screen appears when data are already entered. The browse screen can be used for data viewing and reporting.

Table 3 Navigation in browse screen

Key	Action
Right arrow → or ctrl S	Move to next data column (attribute)
Left arrow ← or ctrl D	Move to previous data column (attribute)
Down arrow ↓	Move one record down
Up arrow ↑	Move one record up
Page down	Move the amount of screen records down
Page up	Move the amount of screen records up
Home or ctrl A	Move to first screen position
End or ctrl F	Move to last screen position
Ctrl page up	Move to first record
Ctrl page down	Move to last record
Ctrl home	Move to left most data column in first record
Ctrl end	Move to right most data column in first record
Ctrl left arrow ←	Move to previous data column and move screen position
Ctrl right arrow →	Move to next data column and move screen position
F3	View the entire field (remark attribute)

3.3.4 Pick list

The pick list appears, in case attribute-values have pre-defined codes (attributes with _C extension). It shows up as an inset screen in the input and edit screen, when non-valid codes are entered, or codes that have not yet been defined under the CODES option (see 6.1).

Navigation in the pick list is similar to that in the browse screen, with the exception of the left and right actions. Besides navigation with arrows in the pick list, it is also possible to move the cursor by entering the first character. As this option is case-sensitive, one should enter <shift> together with the character in case the codes name starts with a upper case character.

4 DATABASE

With the DATABASE option one enters the actual database. The majority of the work within TROFOLIN will be carried out in this option.

4.1 Database structure

In Figure 2 the structure of the database is displayed. Each block in this figure describes an entity and represents a number of interrelated data. Each entity has its own data file, in which all entity-data are stored. A short description of the entities is presented in Table 4. An exhaustive list of entities with associated attributes is given in Annex I.

Table 4 Description of entities

Entity	**Description**
SUR_AREA	Survey area
CLIMSTAT	Climatic data
LAND_MAP	Land mapping units
LAND_ELE	Land elements
LU_SUBEL	Land use sub elements
OBS_SITE	Observation site
SITEDESC	Site description
VEG_RELE	Vegetation relevee
VEG_STRU	Vegetation structure
VEG_SPEC	Vegetation species
LAND_USE	Land use at observation site
HP_PIT	Humus profile pit
HP_LAY	Humus profile pit layer
HP_SAMP	Humus profile pit samples
HP_ANAL	Humus profile pit analysis
MSP_PIT	Mineral soil profile pit
MSP_LAY	Mineral soil profile pit layer
MSP_SAMP	Mineral soil profile pit samples
MSP_ANAL	Mineral soil profile pit analysis
AUGERING	Augering
AUG_LAY	Augering layer

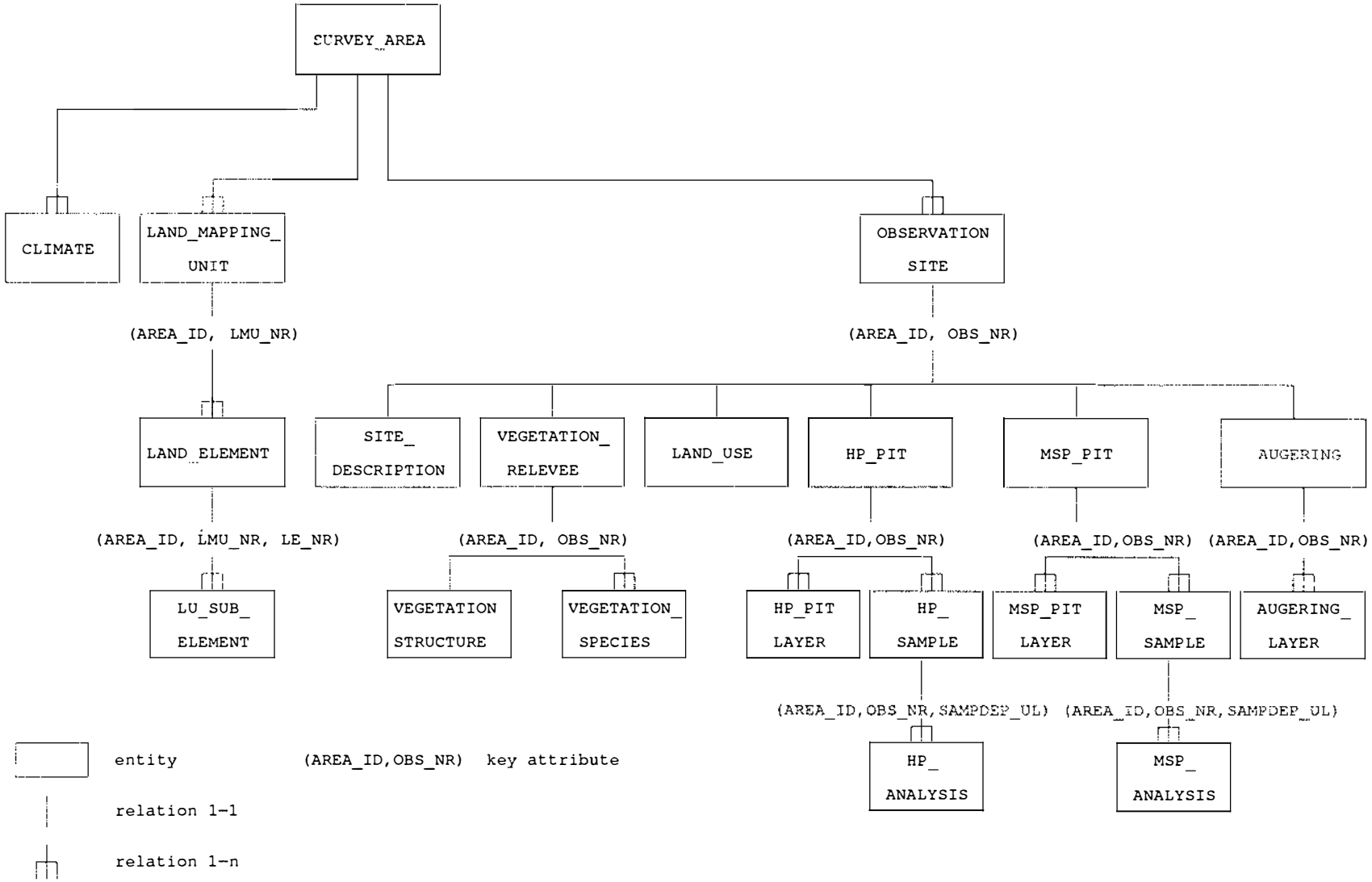


Figure 2 Datamodel TROFOLIN

The structure of the database is also displayed in the database menu. An example of this menu is presented in Figure 3.

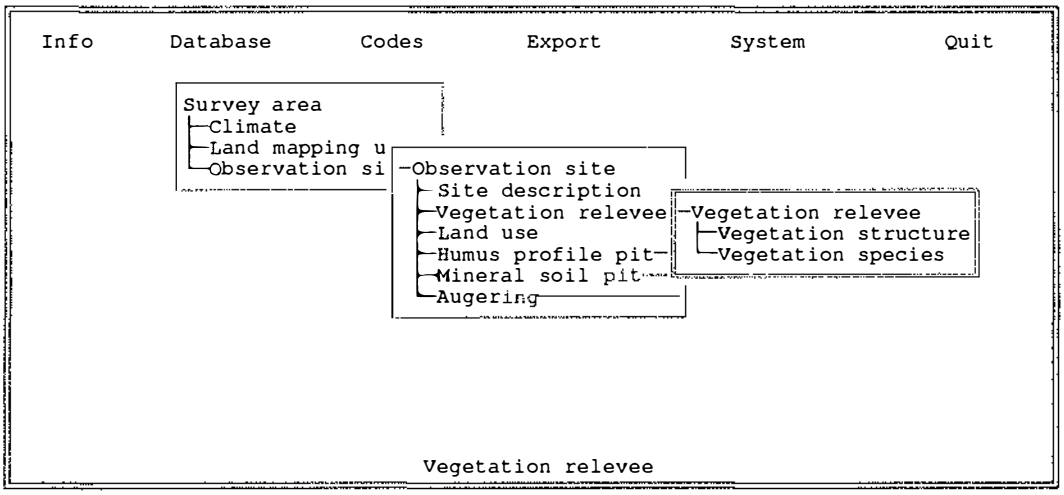


Figure 3 Example of DATABASE menu

At the highest (first) level of TROFOLIN, the entity survey area (SUR_AREA) is distinguished. Within a Tropenbos location one or more survey areas may be distinguished, each with a unique identification (AREA_ID). Each record has to be recognized as a record of a specific survey area, therefore AREA_ID is the key attribute of each entity in the database.

At the second level, the entities climate (CLIMSTAT), land mapping unit (LAND_ MAP) and observation site (OBS_SITE) are distinguished. Land mapping unit and observation site is identified by a sequence number (LMU_NR and OBS_NR). The entities land mapping unit and observation site are further subdivided (see Figure 2 and 3). LMU_NR and OBS_NR, each in a unique combination with AREA_ID, are used as key attributes at the third level.

In the example presented in Figure 4 the entity site description (SITEDESC) has been selected from the menu. Key attributes are AREA_ID (identification of the survey area) and OBS_NR (number of observation site). The key attribute AREA_ID has a default value, while the second key attribute OBS_NR has no default value. The last entered AREA_ID will be the default value during one TROFOLIN session. The OBS_NR can be entered directly or can be selected from a pick list by pressing <enter>. From this pick list one can choose the required one out of the observation numbers previously entered.

Some entities (LU_SUBEL, HP_ANAL and MSP_ANAL) even require a third key attribute, before data can be entered in these entities. For example, for the entity land use subelement the key attributes AREA_ID, LMU_NR and LE_NR must be known, before one is admitted to enter and save data into the entities attribute fields.

NOTE: *Entering data into a lower level entity is possible only if the key attribute in the higher level entity is stored. For example, data cannot be entered in the entity SITEDESC if the entity OBSERVATION SITE does not contain already the OBS_NR in question. If a non-existing OBS_NR is entered in a third or lower level entity, the following message will appear: 'This observation number does not exist'.*

If the requested, correct key attributes are given, there are two possibilities:

1 No records have been entered yet in the entity. In this case the input and edit screen will appear. Data can be entered now.

2 Records were already entered under the given key attributes of the entity. In this case the browse screen will appear, to show the existing records.

4.2 Input and edit screen

The input and edit screen can be used to add new records or to modify existing records of an entity. The screen consists of three parts (Figure 4).

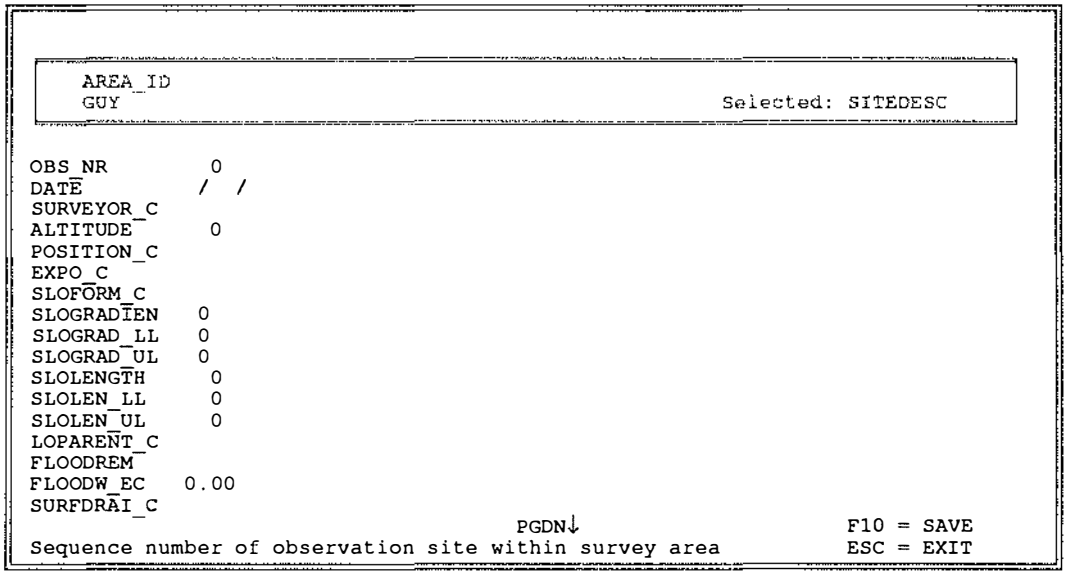


Figure 4 Example of an input and edit screen

In the first part (box at the top of the screen) the key attributes (e.g. AREA_ID: GUY) and the name of the entity (SITEDESC) are given.

In the second part (central part of the screen) the attribute names and their input fields are displayed. Usually, not all of the entities' attributes can be displayed on one screen. The characters PGDN↓ at the bottom of the screen indicate that there

are other attributes waiting to be described. By pressing <page down> one will retrieve a next screen with more attributes (see para 3.3.2 for navigation).

Four different types of attributes are distinguished: numerical, logical, coded and remark attributes:

1 Numerical attributes require figures as input. These attributes have the value 0 as default.

CAUTION: *TROFOLIN always generates 0 as default for numerical attributes (alike dBASE). Therefore it is not possible to distinguish attributes which have a real 0 value from those for which data are lacking. Confusion can be avoided by entering another value for the default (e.g. a negative value or an unreal value such as 9999).*

2 Logical attributes (attribute name with _L extension) require yes (Y) or no (N) as input. These attributes have the value N as default.

3 Coded attributes (attribute name with _C extension) require a code as input. Most of the codes are already pre-defined in TROFOLIN (see para 6.1 and Annexes I and II). These appear in a pick list, which shows up as inset on the input and edit screen, when non-existing codes are entered. Location specific codes (such as map unit symbols, surveyors names, meteo stations, etc) should be entered by the user (see para 6.2).

4 Remark attributes have no input restrictions, any character can be entered.

In the third part (box at the bottom of the screen) a short description of the activated attribute is given.

If the data input is completed, the record must be saved with <F10>. TROFOLIN will ask for confirmation before actually saving the record. The following options can be selected:

(Y)es, Save+Clear	This option saves the record and moves to an empty screen, in which the next record can be entered.
(C)opy, Save+Copy	This option saves the record and copies the last data input to the next input and edit screen. This option is especially interesting if only a few data in the next record differ from the former (for example in soil horizons), so that only the differing attributes have to be edited.
(N)o, Continue	This option continues the data input.

If no new records need to be stored, return to the browse screen with <Esc>.

4.3 Browse screen

The browse screen is meant for viewing, deleting and reporting of data. It also may be used to activate the input and edit screen. The browse screen consists of three parts (Figure 5).

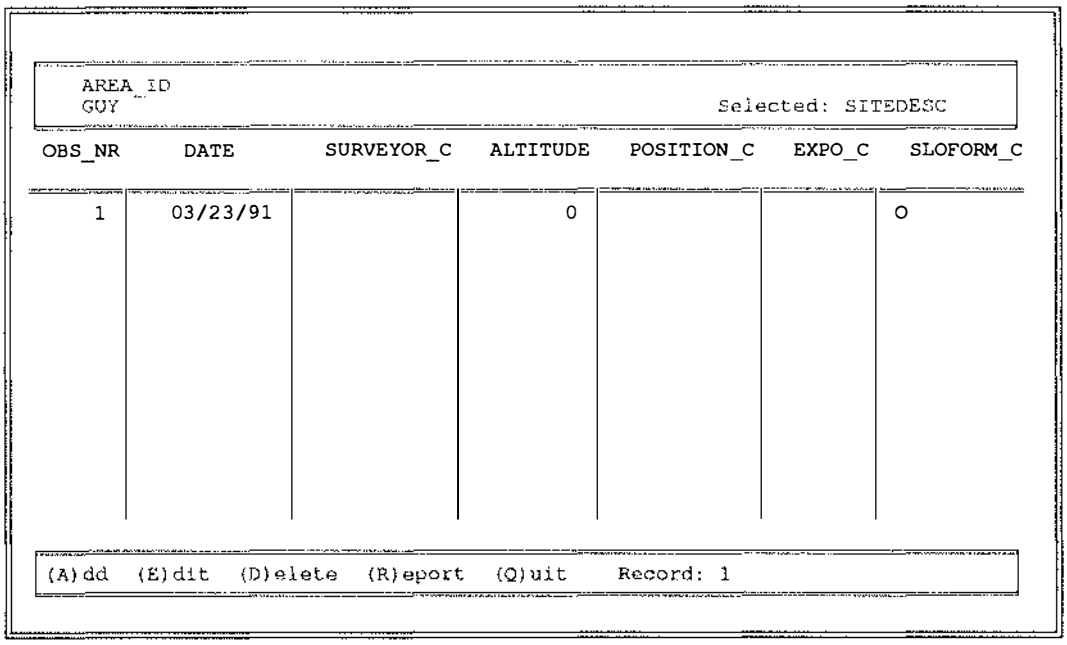


Figure 5 Example of a browse screen

In the first part (box at the top of the screen) the key attributes (AREA_ID: GUY) and the name of the entity (SITEDESC) are given.

In the second part (central part of the screen) the names of the attributes and the values for these attributes are given. Usually, only part of the attributes is displayed on the screen. With the → and ← arrows one can move along the complete set of attribute columns, so that all can be viewed (see para 3.3.3 for navigation). Browse screens that contain many rows have a 'frozen' first column, in order to keep a reference number in sight.

In the third part (box at the bottom of the screen) five options and the record number are displayed. The options can be activated by typing the first letter:

(A)dd To add new data; the input and edit screen is activated.
(E)dit To edit existing data; the input and edit screen is activated.
(D)elete To mark records for deletion.
(R)eport To generate a simple standard report of the entered data.
(Q)uit To return to the main menu.

4.3.1 Options Add and Edit

The (A)dd and (E)dit options activate a blank edit screen to add new data, or an edit screen with existing data that need to be edited.
The (A)dd option does not allow existing key attributes to be entered for a second time. In case of LMU_NR or OBS_NR, a warning will immediately appear: 'This land mapping unit (observation number) is already in use'. Existing key attributes in lower level entities (e.g. LAYER_NR in entity MSP_LAY) can be entered twice, without immediate warning. However, when one tries to save the data entered in the editing screen, the warning will appear. One has to return to the key attribute (LAYER_NR) and rectify the number.

4.3.2 Option Delete

The (D)elete option removes unwanted records directly from the browse screen. In reality, however, this option only marks records for deletion. Permanent removal of records is possible with the pack database option (SYSTEM menu, see para 7.1).

CAUTION: *LOWER LEVEL RECORDS WHICH ARE RELATED TO A MARKED HIGHER LEVEL RECORD, WILL AUTOMATICALLY BE MARKED FOR DELETION AS WELL.*

Records that are deleted from the browse screen can be reinstated by the option RECALL in dBASE (see para 9.3). This option resets (brings back deleted) records so that they are no longer marked for deletion.

4.3.3 Option Report

TROFOLIN offers several ways of viewing data, both on and off the screen (printer, file). The (R)eport option in TROFOLIN only generates a simple columnar display of the entered data. More sophisticated reporting, such as the compilation of tables of selected records, can be generated through dBASE. Some progamming examples are given in annex IV.

First, three options can be selected in (R)eport:

(T)otal	All records of the selected entity (also those records that belong to an other AREA_ID) will be reported. The number of this total amount of records is shown here.
(V)iew	All records of the selected entity within the presently active AREA_ID will be reported. The number of these records within the survey area is given.
(C)ancel	To return to the browse screen.

After selection of (T)otal or (V)iew, three options are displayed:

(T)ranslate	To translate codes and codes descriptions to another language.

	This option should only be used if USER_CODE and USER_DESC have been specified under CODES of the main menu (see 5.2).
(N)o Translation	To describe codes in English, as defined by the TROFOLIN application.
(C)ancel	To return to the browse screen.

Finally, the selection is made how to display the data:

(F)ile	To send the list of records to a text file. TROFOLIN creates a file with extension .prn. It is possible to use any text editor or word processor to open and edit this file.
(P)rint	To send the list of records to a printer. A printer should be connected to the system. If the printer is not connected, the message 'the printer is not ready, Retry (Y)es (N)o' will appear on the screen.
(S)creen	To send the list of records to the screen (option only accessible in the (V)iew option). The maximum number of records that can be viewed on screen is 200.
(C)ancel	To return to the browse screen.

An example of a report of one record in entity MSP_LAY is given in annex III.

NOTE: *TROFOLIN will list all records of one entity in the (R)eport option. It is not possible to display specific records in TROFOLIN. One has to consult dBASE in order to display selected records. This option is described in para 9.7.*

5 CODES

5.1 General

The majority of attributes in TROFOLIN are so-called coded attributes and can be recognized by the extension _C following the attribute name. These attributes have in most cases codes and descriptions, that are already defined and standardized by TROFOLIN. The standardized descriptions are meant to be universally applied in the Tropenbos research sites, for the sake of comparability of their data and the development of common methodologies. However, a second category coded attributes exists, that needs site-specific codes and descriptions, such as SURVEYOR_C, CLIMSTAT_C, PHOTOSYM_C, etc. Thus, TROFOLIN contains pre-defined code lists for a number of attributes, and offers the possibility to compile new codes lists that suit a certain location.

All codes are stored in two separate entities. The first entity, REF_TAB1, is a reference table for coded attributes. In the second entity, REF_TAB2, the values for a coded attribute are defined.

When a code is entered for an attribute in the editing screen of the DATABASE mode, three situations are possible:

1 The code is accepted because it occurs in the pre-defined list.
2 The code is not accepted because it does not occur in the pre-defined list. A pick list of possible codes appears on the screen, from which the proper code can be selected by using the ↕ arrows and pressing <enter>.
3 The code is not accepted because no pre-defined list exists yet. The message 'no items found -press a key' will appear. Codes will only be accepted after they have been entered (see para 5.2).

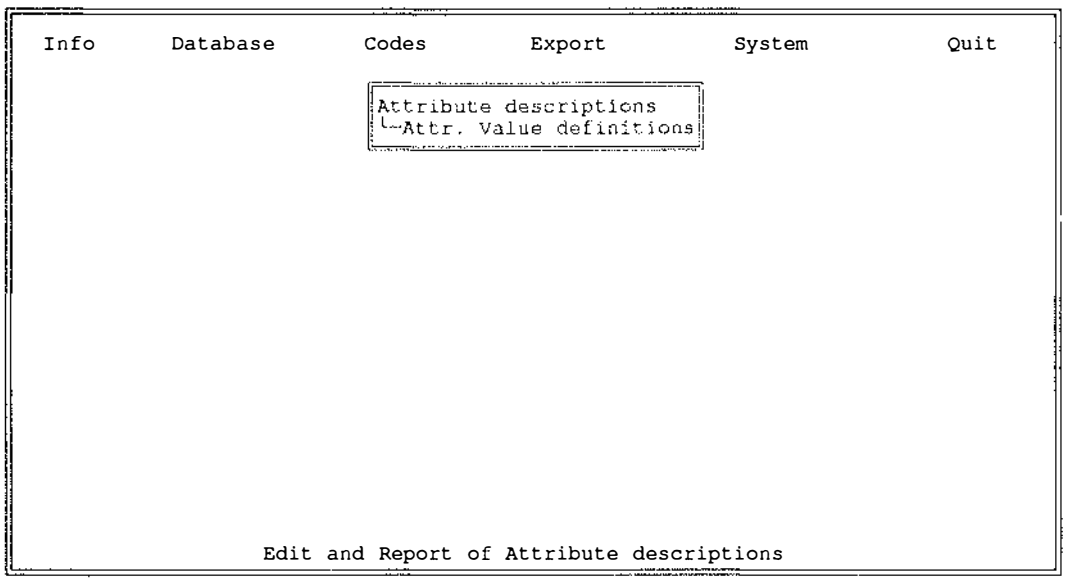


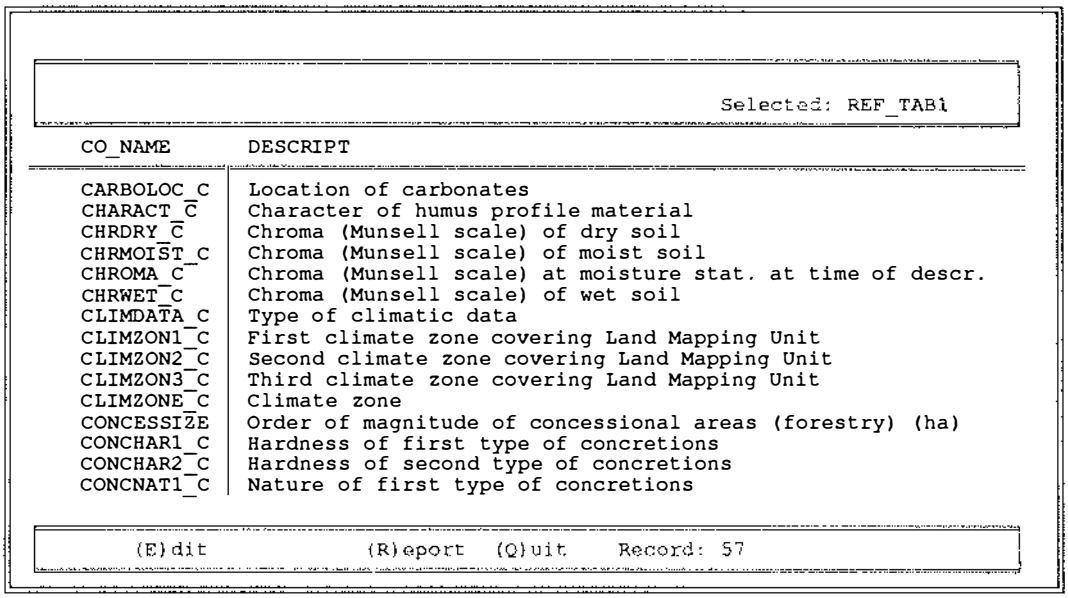
Figure 6 CODES menu

5.2 Adding new codes

With the CODES option in the menu new code lists can be compiled and new codes can be added to existing lists (Figure 6). The procedure for adding new codes will be illustrated with the following example.

1 One wants to enter the code I as a new climatic zone, which is classified as humid with a r/Eo ratio > 0.80.

2 Select the option 'Attribute descriptions' in the CODES menu. This screen displays REF_TAB1 with the attributes CO_NAME, DESCRIPT and CODE_TAB. Move to the CO_NAME CLIMZONE_C. The screen as displayed in figure 7 will appear. By using the arrow → the right side of the screen comes into view. Check the key attribute CODE_TAB, which is needed for the next step. In this case it is also CLIMZONE_C. Leave the screen and return to the CODES menu by pressing <Esc>.



Selected: REF_TAB1

CO_NAME	DESCRIPT
CARBOLOC_C	Location of carbonates
CHARACT_C	Character of humus profile material
CHRDRY_C	Chroma (Munsell scale) of dry soil
CHRMOIST_C	Chroma (Munsell scale) of moist soil
CHROMA_C	Chroma (Munsell scale) at moisture stat. at time of descr.
CHRWET_C	Chroma (Munsell scale) of wet soil
CLIMDATA_C	Type of climatic data
CLIMZON1_C	First climate zone covering Land Mapping Unit
CLIMZON2_C	Second climate zone covering Land Mapping Unit
CLIMZON3_C	Third climate zone covering Land Mapping Unit
CLIMZONE_C	Climate zone
CONCESSIZE	Order of magnitude of concessional areas (forestry) (ha)
CONCHAR1_C	Hardness of first type of concretions
CONCHAR2_C	Hardness of second type of concretions
CONCNAT1_C	Nature of first type of concretions

(E)dit (R)eport (Q)uit Record: 57

Figure 7 Attribute descriptions, browse screen

In many cases the attribute name under CODE_TAB is similar to the name under CO_NAME. However, several groups of related attributes will need identical codes and values. These all share therefore only one attribute name under CODE_TAB, for example:

CO_NAME	DESCRIPT	CODE_TAB
CLIMZON1_C	First climate zone covering Land Mapping Unit	CLIMZONE_C
CLIMZON2_C	Second climate zone covering Land Mapping Unit	CLIMZONE_C
CLIMZON3_C	Third climate zone covering Land Mapping Unit	CLIMZONE_C
CLIMZONE_C	Climate zone	CLIMZONE_C

By entering a certain code for CLIMZONE_C, the same code will also become

valid for the attributes CLIMZON1_C, CLIMZON2_C and CLIMZON3_C. This is the case for all the related attributes that share one CODE_TAB.

3 Choose the next menu option 'Attribute Value definitions'. This screen displays REF_TAB2, that contains the codes/values for coded attributes. Enter the name CLIMZONE_C under CO_NAME. If no codes are available for this attribute, an edit screen will appear, otherwise a browse screen. If the browse screen appears, one can go to the edit screen by pressing (A)dd (see Figure 8).

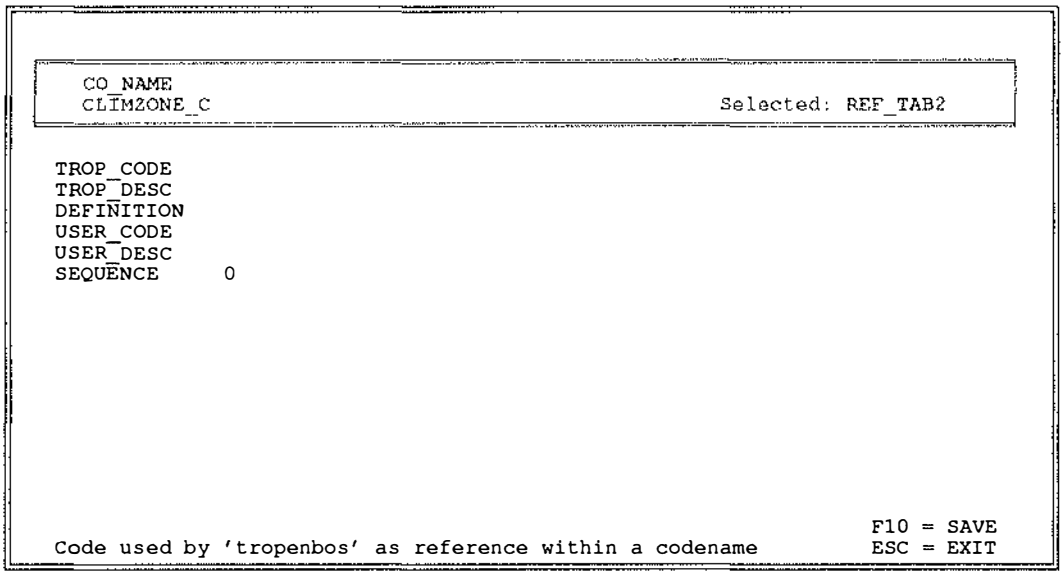


Figure 8 Attribute Value definitions, edit screen

4 The climate code **I** can be entered in TROP_CODE. TROP_DESC gives a short description of the code value, in this example **humid**. DEFINITION can be used to specify the code value in more detail. In this example: **r/Eo ratio > 0.80** should be entered. All can be saved by pressing F10.

USER_CODE and USER_DESC can be used when it is required to translate the attribute definitions into another language. By selecting (T)ranslate in the (R)eport option in the DATABASE mode, the value of the attribute will be described in the defined language (see 4.3.3). However, switching language in the pick lists' attribute descriptions is not possible.

With SEQUENCE, codes can be sorted, so that they appear in the pick lists in the order that is required. Without using the SEQUENCE attribute, codes/values are ordered alphabetically and appear in that order in the pick lists as well.

NOTE: *When adding new codes the message 'Added records cannot be deleted' will appear. Within TROFOLIN it is not possible to delete codes. This requires action in dBASE (see para 9.3).*

NOTE: *The field length for a TROP_CODE in REF_TAB 2 is standard. However, do not enter a TROP_CODE with more characters than the field length of the attribute can harbour. Codes that are longer than the attribute's field length in the edit screen will not be recognised. Consult ANNEX I when entering new codes.*

6 EXPORT

The EXPORT option (see Figure 9) offers the possibility to transfer data from TROFOLIN into other programmes, such as Lotus-1,2,3, Qpro, Oracle, SPSS.

This is achieved by means of a DBMS-Copy programme. This programme is activated by pressing <enter>. TROFOLIN is now connected through DOS with the DBMS-Copy. For further action one has to consult the DBMS-Copy manual.

NOTE: *In the present release of TROFOLIN the DBMS-Copy programme is not (yet) available. The DBMS-Copy programme has to be acquired individually (through the Tropenbos Foundation).*

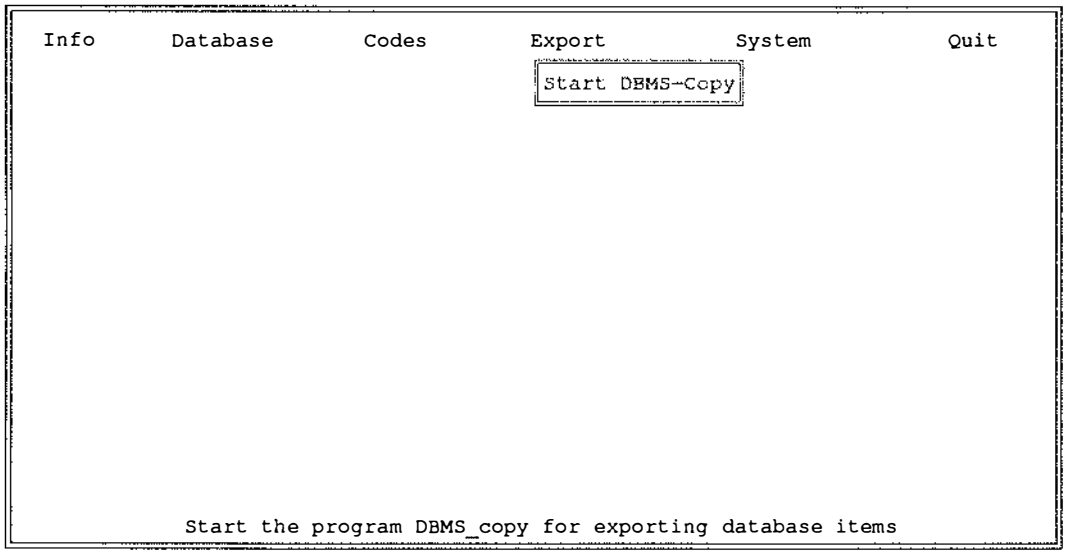


Figure 9 EXPORT menu

7 SYSTEM

The SYSTEM option offers maintenance utilities for TROFOLIN (see Figure 10).

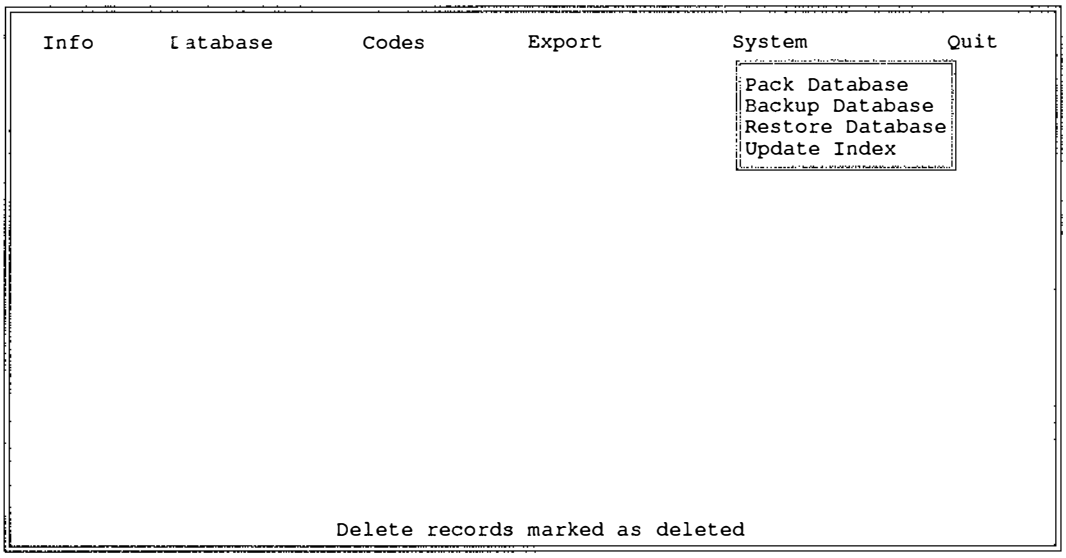


Figure 10 SYSTEM menu

7.1 Pack Database

This option permanently removes all records in the database which are marked for deletion through the delete option in the browse screen (see 4.3.2). Once this command is used, data cannot be retrieved. Additionally this option will update each of the indexes (see para 7.4).

NOTE: *The pack database option will start immediately after pressing <enter>.*

7.2 Backup Database

This option creates a copy of all data files in the TROFOLIN\DATA directory to diskette. If this option is activated, it has to be confirmed whether one wants to (P)roceed or (C)ancel the procedure. After proceeding, the drive has to be selected to which the data files are to be saved. Again the question appears whether to (P)roceed or (C)ancel the procedure.

7.3 Restore Database

This option transfers data files from diskette to the hard disk in the TROFOLIN directory from a backup (see Backup Database).

CAUTION: *By using the restore database option, all the existing data files in the TROFOLIN directory will be overwritten !! (See also para 9.3)*

7.4 Update Index

Index files (.NTX) control the sequence of datafile fields (numerically, alphabetically, chronologically). The Update Index option rearranges the logical sequences of the database after deleting or adding parts, and should always be used when data are altered outside the TROFOLIN application, e.g. through dBASE.

CAUTION: *In case key attributes are changed outside TROFOLIN, the update index option will not guarantee that the database will remain consistent.*

8 QUIT

The QUIT option offers the possibility to exit the TROFOLIN application and return to MS-DOS.

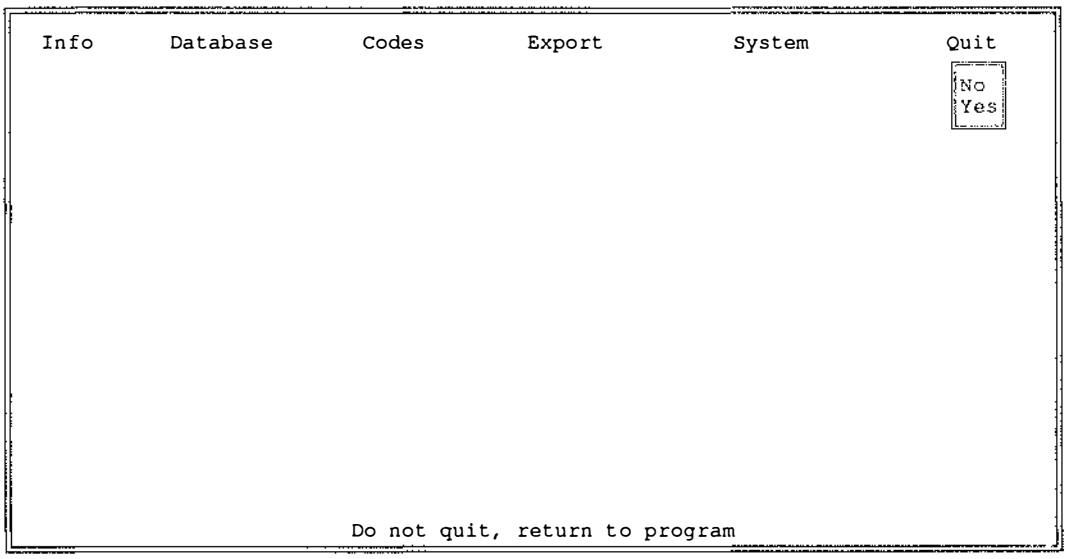


Figure 11 QUIT menu

Select (Y)es and press <enter>.

9 TECHNICAL NOTES ON DBASE

9.1 General

TROFOLIN primarily offers sufficient options for storage of data. For the manipulation and selection of data, for a sophisticated output of compiled reports and for modifications of the database, it will be necessary to use dBASE. Some user experience with dBASE is required. This chapter briefly describes methods to solve certain problems, but is by no means complete. It should only be used in addition to the dBASE manual.

CAUTION: *Be always sure that you have an up-to-date backup of all files concerned.*

9.2 Change structure of data files

Attributes (fields) can be deleted or added to entities (data files). It should be stressed that changing key attributes should be avoided. Always use the Update Index option in TROFOLIN after changing the structure.

1 Select the proper directory with SET DIRECTORY TO C:\TROFOLIN\DATA
2 Open the TROFOLIN data file to be modified with USE
3 The structure of the data files can be changed with MODIFY STRUCTURE
4 <CTRL> <N> is used to insert new fields, <CTRL> <U> to delete fields
5 Save the new structure with <CTRL><End>
6 Use Update index option in TROFOLIN

9.3 Delete codes

New codes can be added in the CODES menu of TROFOLIN, but cannot be deleted. For this, dBASE needs to be consulted.

1 Select the proper directory with SET DIRECTORY TO C:\TROFOLIN\DATA
2 Open the TROFOLIN data file to be modified with USE
3 Mark record for deletion with DELETE [<scope>] [FOR<condition>] [WHILE<condition>]
4 Check result with LIST. The records marked for deletion are indicated with an asterix (*).
5 Remove the records that are marked permanently with PACK

NOTE: *Records that are marked for deletion in the active database file can be reinstated with RECALL [<scope>][FOR <condition>][WHILE <condition>].*

9.4 Append data

In order to link two TROFOLIN data files of the same entity, but with different data, together into one, the records from one data file (source file) can be copied to the end of the active data file (target file).

1 Select the proper directory with SET DIRECTORY TO C:\TROFOLIN\DATA
2 Open one of the data files (target file) with USE
3 Add records from source data file with APPEND FROM <source file>

Specific records can be selected by adding a condition to APPEND FROM <source file> FOR <condition>

Not only records can be copied between TROFOLIN data files, also data from non-TROFOLIN data files can be entered into a TROFOLIN file. The structure of this non-TROFOLIN file (source file) has to be similar to the TROFOLIN data file (target file). Only attributes with the same attribute name and attribute type are copied.

9.5 Selections within one TROFOLIN data file

Selections can be made on a number of selection requirements (attributes, attribute value ranges) within one (TROFOLIN) entity. One has to make use of logical and relational operators. The result can be copied to a new file. This file should be tranferred to a newly created directory outside TROFOLIN to avoid error messages.

1 Select the proper directory with SET DIRECTORY TO C:\TROFOLIN\DATA
2 Open one of the data files with USE
3 Copy the records, selected with the required variables to a new file with COPY TO <new name> FOR <condition, e.g. .AND. .OR. .NOT.>
4 Transfer new file to directory ouside TROFOLIN

9.6 Combine selections from different TROFOLIN data files

Information out of different data files can be selected and listed on the screen. A precondition is, that one makes index files in dBASE in advance. The data files are linked with unique key variable(s). The file to which the connection is made, should be indexed on the key variable.

A data file can be indexed with INDEX ON <key variable(s)> TO <indexname>. When two or more key variables are used, they should be jointed with +. Be aware that the key variables have to be of the same type (numeric, character string, date, logical). If this is not the case the following functions can be interesting:
LOWER() Puts all characters in lower case
UPPER() Puts all characters in upper case

SUBSTR() Only uses part of the field
STR() Changes numerical type into string type

1 Select the proper directory with SET DIRECTORY TO C:\TROFOLIN\DATA
2 Select the first work area with SELECT 1
3 Open a first data file in this first work area with USE
4 Select the second work area with SELECT 2
5 Open the second data file in the second work area with USE
6 Open the index file (on the key variable(s)) of the second data file with SET INDEX TO <indexname>
7 Select the first work area with SELECT 1
8 Relate the first data file with the second data file on the selected key variables with SET RELATION TO <key variable(s)> into <datafile 2>

The two data files are linked and information can be derived from both files simultaneously. Fields in the non-active area (in this case work area 2) are referred to as: b-> fieldname.

To obtain a listing of certain information with the key variables:
LIST FIELDS <key variables, other variables form work area 1, b->other variables from work area 2>.

9.7 Report selected records

In contrast to the TROFOLIN Report function, that will only display **all** records of an entity, it is possible to print all or **parts of** an active data file with the help of dBASE.

1 Select the proper directory with SET DIRECTORY TO C:\TROFOLIN\DATA
2 Open the TROFOLIN data file to be transferred with USE
3 Selected data can be printed with REPORT FORM <name> FOR <condition> TO PRINT

9.8 Transfer TROFOLIN data files to text files (ASCII) or LOTUS files

All or part of an active data file can be transferred to a text file or Lotus file.

1 Select the proper directory with SET DIRECTORY TO C:\TROFOLIN\DATA
2 Open the TROFOLIN data file to be transferred with USE
3 Copy the file to a text file with COPY TO <new name> SDF
4 Copy the file to a lotus file with COPY TO <new name> WKS

Field names are not copied.

Also for this option specific records can be copied with COPY TO <new name> FIELDS <field list> FOR <condition> SDF.

REFERENCES

ASHTON TATE, 1988. *Database Package dBASE, versions III and IV*. Manuals, 5 vols.

FAO, UNESCO, ISRIC, 1988. *FAO-Unesco Soil map of the world: revised legend.* World soil resources report 60, FAO, Rome, Italy.

GESINK, H.J., Y.VAN RANDEN AND L.TOUBER, 1990. *Datamodel for tropical forest land inventories at reconnaissance level.* Report 38, The Winand Staring Centre/The Tropenbos Foundation, Wageningen, The Netherlands.

KOPPEN, W., 1931. *Die Klimate der Erde.* Walter de Gruyter Co., Berlin, Germany.

MEIJERINK, A.M.J., 1988. Data acquisition and data capture through terrain mapping units. *ITC Journal* 1988-1:23-44

SOIL SURVEY STAFF, 1987. *Keys to Soil Taxonomy (third printing).* SMSS Technical Monograph 6. Cornell University, Ithaca, USA.

TOUBER, L., E.M.A. SMALING, W. ANDRIESSE and R.T.A. HAKKELING, 1989. *Inventory and evaluation of tropical forest land. Guidelines for a common methodology.* Tropenbos Technical Series 4. Tropenbos, Ede, The Netherlands.

UNESCO, 1973. *International classification and mapping of vegetation.* Ecology Conservation 6, Unesco, Paris, France.

WAVEREN VAN E.J. AND A.B. BOS, 1988. *ISRIC Soil Information System: User Manual and Technical Manual. Revised Edition.* Technical Paper no.15, ISRIC, Wageningen, The Netherlands.

ANNEX I

ENTITIES AND ATTRIBUTE DESCRIPTIONS

(in alphabetical order)

Entity : AUGERING

Augerings are recognized as a separate entity because of the different interpretation value of data collected from augerings as compared to profile pits.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
DATE	date	Date of observation (month/day/year)
SURVEYOR_C	char(10)	Surveyor (codes to be established on location)
SOILTYPE_C	char(3)	Soil type (codes to be established on location)

annex I-2

Entity : AUG_LAY (AUGERING LAYER)

The list of attributes is identical to the one of MSP_LAY, except for attributes related to structure and cutans. Most soil characteristics are described with lower accuracy than in a profile pit.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
LAYER_NR	number(2)	Sequence number of layer
HORIZAUG_C	char(6)	Horizon designation (Augering layer) (codes to be established on location)
BOUND_UL	number(6,1)	Upper boundary of horizon; cm below mineral soil surface
BOUND_LL	number(6,1)	Lower boundary of horizon; cm below mineral soil surface
BOUNDWI_C	char(1)	Width of lower boundary of horizon (Augering layer)
		A Abrupt: <2cm
		C Clear: 2-5cm
		G Gradual: 5-12cm
		D Diffuse: >12cm
BOUNDTOP_C	char(1)	Topography of lower boundary of horizon
		S Smooth: no pockets
		W Wavy: pockets wider than deep
		I Irregular: pockets deeper than wide
		B Broken: boundary discontinuous
HUEDRY_C	char(5)	Hue (Munsell scale) of dry soil
VALDRY_C	char(3)	Value (Munsell scale) of dry soil
CHRDRY_C	char(3)	Chroma (Munsell scale) of dry soil
HUEMOIST_C	char(5)	Hue (Munsell scale) of moist soil
VALMOIST_C	char(3)	Value (Munsell scale) of moist soil
CHRMOIST_C	char(3)	Chroma (Munsell scale) of moist soil
MOTTABUND	number(2)	Abundance of mottles; area percentage
MOTTSIZ_C	char(1)	Size of mottles
		F Fine: <5mm
		M Medium: 5-15mm
		C Coarse: >15mm
MOTTCON_C	char(1)	Contrast of mottles
		F Faint
		D Distinct
		P Prominent
MOTTSHA_C	char(1)	Sharpness of mottles
		D Diffuse: >2mm
		C Clear: <2mm
		S Sharp: knife edge
MOTTHUE_C	char(5)	Hue (Munsell scale) of mottles
MOTTVAL_C	char(3)	Value (Munsell scale) of mottles
MOTTCHR_C	char(3)	Chroma (Munsell scale) of mottles
F0_2_C	char(4)	Estimated texture of fine earth (< 2 mm)
		SA Sand
		CSA Coarse sand
		MSA Medium sand
		FSA Fine sand
		VSA Very fine sand
		LSA Loamy sand
		LCSA Loamy coarse sand
		LMSA Loamy medium sand
		LFSA Loamy fine sand
		LVSA Loamy very fine sand
		SAL Sandy loam

		CSAL	Coarse sandy loam
		MSAL	Medium sandy loam
		FSAL	Fine sandy loam
		VSAL	Very fine sandy loam
		L	Loam
		SIL	Silt loam
		SI	Silt
		SACL	Sandy clay loam
		SICL	Silty clay loam
		CL	Clay loam
		SAC	Sandy clay
		SIC	Silty clay
		C	Clay
		HC	Heavy clay
F2_75_C	char(2)	Estimated percentage of gravel (> 2 mm and < 75 mm)	
		NG	No gravel: <2%
		SG	Slightly gravelly: 2-15%
		GR	Gravelly: 15-50%
		VG	Very gravelly: 50-90%
		GA	Gravel: >90%
F75_250_C	char(2)	Estimated percentage of stones (> 75 mm and < 250 mm)	
		NS	No stones: <2%
		SS	Slightly stony: 2-15%
		ST	Stony: 15-50%
		VS	Very stony: 50-90%
		SO	Stones: >90%
F250_C	char(2)	Estimated percentage of boulders (> 250 mm)	
		NB	No boulders: <2%
		BO	Bouldery: 2-50%
		VB	Very bouldery: 50-90%
		BL	Boulders: >90%
CONSDRY_C	char(2)	Consistence of dry soil	
		LO	Loose
		SO	Soft
		SH	Slightly hard
		HA	Hard
		VH	Very hard
		EH	Extremely hard
CONSMOI_C	char(2)	Consistence of moist soil	
		LO	Loose
		VR	Very friable
		FR	Friable
		FI	Firm
		V	Very firm
		EF	Extremely firm
STICKY_C	char(2)	Stickiness	
		NS	Non sticky
		SS	Slightly sticky
		S	Sticky
		VS	Very sticky
PLASTIC_C	char(2)	Plasticity	
		NP	Non plastic
		SP	Slightly plastic
		P	Plastic
		VP	Very plastic
SMEARY_C	char(2)	Smeariness	
		WS	Weakly smeary
		MS	Moderately smeary
		SS	Strongly smeary

		SF	Slightly fluid	
		VF	Very fluid	
ROOTSIZ1_C	char(1)	Size of first type of roots		
		V	Very fine:	<1mm
		F	Fine:	1-2mm
		M	Medium:	2-10mm
		C	Coarse:	10-25mm
		O	Very coarse:	>25mm
ROOTABU1_C	char(1)	Abundance of first type of roots per unit area (i.e. per 2.5x2.5cm for very fine and fine roots; 25x25cm for coarser roots)		
		V	Very few:	3
		F	Few:	3-10
		C	Common:	10-20
		M	Many:	20-30
		A	Abundant:	>30
ROOTSIZ2_C	char(1)	Size of second type of roots		
ROOTABU2_C	char(1)	Abundance of second type of roots per unit area		
ROCKSIZ1_C	char(1)	Size of first type of rock fragments		
		F	Fine gravel:	0.2-1cm
		G	Gravel:	1-7.5cm
		S	Stones:	7.5-25cm
		B	Boulders:	25-50cm
		R	Blocks:	>50cm
ROCKABU1_C	char(1)	Abundance of first type of rock fragments		
		N	None	
		F	Few:	2-15%
		M	Many:	15-50%
		A	Abundant:	>50%
ROCKWEA1_C	char(1)	Degree of weathering of first type of rock fragments		
		F	Fresh	
		W	Slighly weathered	
		S	Strongly weathered	
ROCKNAT1_C	char(2)	Nature of first type of rock fragments (see Annex II for codes)		
ROCKSIZ2_C	char(1)	Size of second type of rock fragments		
ROCKABU2_C	char(1)	Abundance of second type of rock fragments		
ROCKWEA2_C	char(1)	Degree of weathering of second type of rock fragments		
ROCKNAT2_C	char(2)	Nature of second type of rock fragments		
CONCQUA1_C	char(1)	Quantity of first type of concretions		
		N	None	
		V	Very few:	<5%
		F	Few:	5-15%
		Q	Frequent:	15-40%
		R	Very frequent:	40-80%
		D	Dominant:	>80%
CONCSIZ1_C	char(1)	Size of first type of concretions		
		P	Powdery:	diffuse
		S	Small:	<1cm
		L	Large:	>1cm
CONCHAR1_C	char(1)	Hardness of first type of concretions		
		H	Hard	
		S	Soft	
CONCSHA1_C	char(1)	Shape of first type of concretions		
		A	Angular	
		I	Irregular	
		S	Spherical	
CONCNAT1_C	char(1)	Nature of first type of concretions		
		C	Argillaceous	
		F	Ferruginous	
		K	Calcareous	
		M	Manganiferous	

		Q	Siliceous	
		Y	Gypsiferous	
		Z	Saline	
CONCQUA2_C	char(1)	Quantity of second type of concretions		
CONCSIZ2_C	char(1)	Size of second type of concretions		
CONCHAR2_C	char(1)	Hardness of second type of concretions		
CONCSHA2_C	char(1)	Shape of second type of concretions		
CONCNAT2_C	char(1)	Nature of second type of concretions		
CARBOCON_C	char(1)	Content of carbonates; intensity of reaction to HCl (10%)		
		N	Non calcareous:	no reaction visible
		S	Slightly calcareous:	slight reaction
		R	Calcareous:	strong reaction
		V	Strongly calcareous:	violent reaction
PH_H2O	number(4,1)	pH_H_2O		
PH_KCL	number(4,1)	pH_KCl		
EC	number(6,3)	Electric conductivity (mS/cm)		

Entity : CLIMSTAT (Meteorological station)

This entity contains measured mean monthly climatic data on precipitation, potential evapotranspiration, temperature, humidity and hours of sunshine.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
STATION_C	char(2)	Identification of weather station (codes to be established on location)
CLIMDATA_C	char(4)	Type of climatic data P Average monthly/yearly precipitation PET Average monthly/yearly potential evapotranspiration T Average monthly/yearly temperature TMAX Average monthly/yearly maximum day temperature TMIN Average monthly/yearly minimum day temperature HUM Average monthly/yearly relative air humidity I Average monthly/yearly hours of sunshine
XCOOR	char(10)	X coordinate (degrees, minutes, seconds)
YCOOR	char(10)	Y coordinate (degrees, minutes, seconds)
BEGINPERIO	number(4)	Beginning of measurement period
ENDPERIOD	number(4)	End of measurement period
MEASCALC_C	char(1)	Data are measured or calculated C Calculated M Measured
CALCREM	char(150)	Remarks on meth. of calc. of clim. data for the clim.zones
JAN	number(7,1)	Value of 'Climdata' in January
FEB	number(7,1)	Value of 'Climdata' in February
MAR	number(7,1)	Value of 'Climdata' in March
APR	number(7,1)	Value of 'Climdata' in April
MAY	number(7,1)	Value of 'Climdata' in May
JUN	number(7,1)	Value of 'Climdata' in June
JUL	number(7,1)	Value of 'Climdata' in July
AUG	number(7,1)	Value of 'Climdata' in August
SEP	number(7,1)	Value of 'Climdata' in September
OCT	number(7,1)	Value of 'Climdata' in October
NOV	number(7,1)	Value of 'Climdata' in November
DEC	number(7,1)	Value of 'Climdata' in December
YEAR	number(7,1)	Total or average value of 'Climdata' per year
CLIMZONE_C	char(2)	Climate zone (codes to be established on location)
KOPPEN_C	char(4)	Köppen's climate classification AF Tropical wet climate AI Temp. range between warmest/coldest month < 5 °C AM Tropical monsoon climate AS Tropical wet/dry climate; dry spell in summer AW Tropical wet/dry climate; dry spell in winter AW1 Tropical wet/dry climate; rainfall max. in autumn AW2 Tropical wet/dry climate; two diff. rainfall maxima AG Ganges type of tropical climate

Entity : HP_ANAL (HUMUS PROFILE SAMPLE ANALYSIS)

This entity comprises attributes concerning the chemical composition of mixed samples taken in the profile pit and at the sample plots around the humus profile pit.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
SAMPDEP_UL	number(3)	Upper limit of sample depth; cm above mineral soil surface
ANALYS2_C	char(6)	Type of analysis (humus profile)
		WN Weight necro mass
		WR Weight root mass
		C % Carbon, loss on ignition
		NO Organic N, by destruction (Kjeldahl)
		PTO Total organic P, by destruction (Kjeldahl)
		CAT Total Ca, by destruction (HF-HNO3)
		KT Total K, by destruction (HF-HNO3)
		MGT Total Mg, by destruction (HF-HNO3)
		NAT Total Na, by destruction (HF-HNO3)
		PT Total P , by destruction (HF-HNO3)
DATELAB	date	Date of analysis (month/day/year)
LAB_C	char(3)	Laboratory identification (codes to be established on location)
VALUE	number(10,3)	Value for a chemical analysis

Entity : HP_LAYER (HUMUS PROFILE LAYER)

The layers of humus profile pits are described comprehensively. Attributes like thickness of horizon, structure, consistency, abundance of roots by size class, biota are incorporated in this entity.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
LAYER_NR	number(2)	Sequence number of layer
HORIZHP_C	char(6)	Horizon designation (Humus profile pit layer) L Litter horizon LN Fresh, non-fragmented litter, no visible signs of alteration or discolouration. LV Non-fragmented, slightly altered litter, partial or complete discolouration. F Fermentation horizon FR Well identifiable litter fragments with minor amounts of organic material. FM About-equal amounts of more or less fragmented litter and finely divided organic material. H Humus horizon HR Fine organic material dominant, with some litter fragments. HF Fine organic material dominant, no litter fragments, mineral grains are present. AL Upper mineral horizon ALI Upper part of the A horizon with a dark colour, due to the presence of organic material, with a loose structure. ALV Lower part of the A horizon, moderately or slightly coloured by organic material and with a more compact structure.
BOUNDHP_UL	number(6,1)	Upper boundary of horizon; cm above mineral soil surface
BOUNDHP_LL	number(6,1)	Lower boundary of horizon; cm above mineral soil surface
BOUNDWID_C	char(1)	Width of lower boundary of horizon (Humus profile layer) A Abrupt: <0.5cm C Clear: 0.5-1.0cm G Gradual: 1.0-2.0cm D Diffuse: >2.0cm
BOUNDTOP_C	char(1)	Topography of lower boundary of horizon S Smooth: no pockets W Wavy: pockets wider than deep I Irregular: pockets deeper than wid B Broken: boundary discontinuous
MOISTURE_C	char(1)	Moisture status X Dessicated D Dry M Moist W Wet S Saturated
HUE_C	char(5)	Hue (Munsell scale) at moisture status at time of description
VALUE_C	char(3)	Value (Munsell scale) at moisture status at time of description
CHROMA_C	char(3)	Chroma (Munsell scale) at moisture status at time of description
HUEWET_C	char(5)	Hue (Munsell scale) of wet soil
VALWET_C	char(3)	Value (Munsell scale) of wet soil
CHRWET_C	char(3)	Chroma (Munsell scale) of wet soil
CONSIST_C	char(1)	Consistence of humus profile material L Loose: no consistence S Friable: easily crumbling

		F	Firm:	crushing needs moderate pressure
		P	Pliable:	soft and plastic
		R	Resilient:	springy and elastic
		T	Tenaceous:	cohesive, not easily pulled apart
CHARACT_C	char(2)	Character of humus profile material		
		AC	Acerose	
		CR	Crusty	
		FE	Felty	
		FI	Fibrous	
		GE	Greasy	
		GI	Gritty	
		LE	Leafy	
		LI	Ligneous	
		MC	Mucky	
		MO	Mossy	
		MS	Mushy	
STRUCTGR_C	char(1)	Structure grade		
		W	Weak:	<20% aggregated material
		M	Moderate:	20-60% aggregated material
		S	Strong:	>60% aggregated material
STRUCTTY_C	char(2)	Structure type		
		BB	Block-like - blocky	
		BG	Block-like - granular	
		CR	Column-like - recumbent	
		CE	Column-like - erect	
		LC	Plate-like - compact matted	
		LM	Plate-like - non-compact matted	
		NM	Structureless - massive	
		NS	Structureless - single particle	
ROOTSIZ1_C	char(1)	Size of first type of roots		
		V	Very fine:	<1mm
		F	Fine:	1-2mm
		M	Medium:	2-10mm
		C	Coarse:	10-25mm
		O	Very coarse:	>25mm
ROOTABU1_C	char(1)	Abundance of first type of roots per unit area (i.e. per 2.5x2.5cm for very fine and fine roots; 25x25cm for coarser roots)		
		V	Very few:	<3
		F	Few:	3-10
		C	Common:	10-20
		M	Many:	20-30
		A	Abundant:	>30
ROOTORI1_C	char(1)	Orientation of first type of roots		
		H	Horizontal	
		O	Oblique	
		V	Vertical	
		R	Random	
ROOTSIZ2_C	char(1)	Size of second type of roots		
ROOTABU2_C	char(1)	Abundance of second type of roots per unit area		
ROOTORI2_C	char(1)	Orientation of second type of roots		
ROOTSIZ3_C	char(1)	Size of third type of roots		
ROOTABU3_C	char(1)	Abundance of third type of roots per unit area		
ROOTORI3_C	char(1)	Orientation of third type of roots		
ROOTSIZ4_C	char(1)	Size of fourth type of roots		
ROOTABU4_C	char(1)	Abundance of fourth type of roots per unit area		
ROOTORI4_C	char(1)	Orientation of fourth type of roots		
ROOTSIZ5_C	char(1)	Size of fifth type of roots		
ROOTABU5_C	char(1)	Abundance of fifth type of roots per unit area		
ROOTORI5_C	char(1)	Orientation of fifth type of roots		
BIOTYP1_C	char(1)	First type of biota		

		A Arthropoid-type
		E Enchytroid-type
		M Mite-type
		W Wormcasts
BIOABU1_C	char(1)	Abundance of first type of biota
		N None
		F Few
		C Common
		A Abundant
BIODIS1_C	char(1)	Distribution of first type of biota
		B Banded
		C Clustered
		R Random
BIOTYP2_C	char(1)	Second type of biota
BIOABU2_C	char(1)	Abundance of second type of biota
BIODIS2_C	char(1)	Distribution of second type of biota
BIOTYP3_C	char(1)	Third type of biota
BIOABU3_C	char(1)	Abundance of third type of biota
BIODIS3_C	char(1)	Distribution of third type of biota
BIOTYP4_C	char(1)	Fourth type of biota
BIOABU4_C	char(1)	Abundance of fourth type of biota
BIODIS4_C	char(1)	Distribution of fourth type of biota
FUNGABU_C	char(1)	Abundance of soil flora (fungal mycelia)
		N None: not visible
		F Few: occasionally present
		C Common: commonly observed
		A Abundant: continuously obs. throughout horizon
FUNGDIS_C	char(1)	Distribution of soil flora (fungal mycelia)
		B Banded
		C Clustered
		R Random
NUMBERS	number(1)	Number of sampled subplots partaking
DISTAN_LL	number(4,1)	Distance of nearest sampled subplot
DISTAN_UL	number(4,1)	Distance of remotest sampled subplot
WEIGHTAV	number(4)	Average value dry weight organic matter of layer in sampled plots
WEIGHT_UL	number(4)	Maximum value dry weight organic matter of layer among sample plots
WEIGHT_LL	number(4)	Minimum value dry weight organic matter of layer among sample plots
ROOTFINE	number(4)	Average value dry weight of fine roots (diam.<5mm) of layer in sampled plots (g)
ROOTCOARS	number(4)	Average value dry weight of coarse roots (diam. >5mm) of layer in sampled plots (g)
ROOTFI_LL	number(4)	Minimum value dry weight of fine roots (diam. <5mm) of layer among sampled plots (g)
ROOTCO_LL	number(4)	Minimum value dry weight of coarse roots (diameter >5mm) of layer among sampled plots (g)
ROOTFI_UL	number(4)	Maximum value dry weight of fine roots (diam. <5mm) of layer among sampled plots (g)
ROOTCO_UL	number(4)	Maximum value dry weight of coarse roots (diameter >5mm) of layer among sampled plots (g)
PH_H2O	number(4,1)	pH_$H_2$20, av. value of layer in plots
PH_KCL	number(4,1)	pH_KCL, av. value of layer in plots
EC	number(6,3)	Electric conductivity (mS/cm), av. value of layer in plots
PH_H2O_LL	number(4,1)	pH_$H_2$20, minimum value of layer among plots
PH_KCL_LL	number(4,1)	pH_KCL, minimum value of layer among plots
EC_LL	number(6,3)	Electric conductivity (mS/cm), minimum value of layer among plots
PH_H2O_UL	number(4,1)	pH_$H_2$0, maximum value of layer among plots
PH_KCL_UL	number(4,1)	pH_KCL, maximum value of layer among plots
EC_UL	number(6,3)	Electric conductivity (mS/cm), maximum value of layer among plots

Entity : HP_PIT (HUMUS PROFILE PIT)

This entity contains general attributes on humus profile pits, e.g. date of observation, humus profile type.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
DATE	date	Date of observations (month/day/year)
SURVEYOR_C	char(10)	Surveyor (codes to be established on location)
HPTYPE_C	char(3)	Humus profile type

Entity : HP_SAMP (HUMUS PROFILE SAMPLE)

This entity describes the humus profile samples taken at an observation site. As these samples are usually a mixture of samples from several sample plots, the attribute NUMBERSAM is included.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
SAMPDEP_UL	number(3)	Upper limit of sample; cm above mineral soil surface
SAMPDEP_LL	number(3)	Lower limit of sample; cm above mineral soil surface
NUMBERSAM	number(2)	Number of samples mixed before analysis

Entity : LAND_ELE (LAND ELEMENT)

The attributes of land elements mainly consist of classifications of the mineral soil profile, humus profile, vegetation and land use. Detailed information on these aspects can be selected from the data collected at the observation sites within a specific land element. The area of a land element is expressed as percentage of the area of its Land Mapping Unit.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
LMU_NR	number(3)	Sequence number of Land Mapping Unit
LE_NR	number(2)	Sequence number of Land Element within Land Mapping Unit
PERC_LMU	number(3)	Percentage of Land Element within Land Mapping Unit
ELEVA_LL	number(4)	Lower limit of elevation above sealevel (m)
ELEVA_UL	number(4)	Upper limit of elevation above sealevel (m)
LOPARENT_C	char(2)	Local parent material (see Annex II for codes)
FLOODC_C	char(1)	Class of floodwater quality
		C Fresh, clear, "Blackwater"
		W Fresh, carrying sediment, "Whitewater"
		F Fresh, unspecified: <0.8mS/cm
		B Brackish: 0.8-20mS/cm
		S Saline: >20mS/cm
FLOODING_C	char(1)	Frequency and duration of flooding
		N Never, or less than once in 10 years
		O Occasional, less than twice in 10 years
		F Frequent, more than twice in 10 years, but not yearly
		Y Yearly; duration less than one month
		B Yearly; duration between 1 - 3 months
		A Yearly; duration more than three months
SOILTYPE_C	char(3)	Soil type (codes to be established on location)
HPTYPE_C	char(3)	Humus profile type (codes to be established on location)
VEGTYPE_C	char(3)	Vegetation type (codes to be established on location)
LANDUSE_C	char(8)	Land use type (codes to be established on location)

Entity : LAND_MAP (LAND MAPPING UNIT)

Land mapping units are described in terms of climate, landform, relief, geology, surface hydrology, morphometric features and, each in a general, classified and aggregated form, vegetation and land use. Most of this information is compiled in the office both before and after fieldwork.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
LMU_NR	number(3)	Sequence number of Land Mapping Unit
PHOTOSY1_C	char(6)	Mapping unit symbol for physiographic unit on photo interpretation map (codes to be established on location)
PHOTOSY2_C	char(6)	Mapping unit symbol for vegetation on photo interpretation map (codes to be established on location)
MAPSYMB_C	char(6)	Final mapping unit symbol (codes to be established on location)
AREA	number(7)	Area (ha)
PERC_SA	number(4,1)	Percentage of survey area
POLYGONS	number(2)	Number of polygons of Land Mapping Unit
CLIMZON1_C	char(2)	First climate zone covering Land Mapping Unit(codes to be established on location)
CLIMZON2_C	char(2)	Second climate zone covering Land Mapping Unit
CLIMZON3_C	char(2)	Third climate zone covering Land Mapping Unit
LANDFORM_C	char(3)	Landform M Mountains and major scarps H Hills and minor scarps R Dissected lower slopes of volcanoes and mountains F Footslopes, glacis, coalescing fans L Plateaus and high level structural plains LC Coastal plateaus LU Plateau/upland transitions U Uplands (incl.dissected 'peneplains' UC Coastal uplands UP Upland/plain transitions Y Piedmont plains P Plains PN Non dissected erosional plains PD Dissected erosional plains PS Sedimentary plains PT Sedimentary plains of upper river terraces PF Sedimentary plains of large alluvial fans PC Coastal plains PV Volcanic plains PL Lacustrine plains A Flood plains B Bottom lands D Dunes LA (Recent) lava flows S Swamps T Tidal swamps/flats V (Minor) valleys W 'Badlands' Z Beach ridges
RELIEF_C	char(1)	General descriptive classification of relief F Flat-almost flat: slopes <2% U Undulating: slopes 2-8% R Rolling: slopes 8-16% H Hilly: slopes 16-30% S Steeply dissected: slopes >30%

		M	Mountainous:	slopes >30%, with great range in elevation
ELEVA_LL	number(4)	Lower limit of elevation above sealevel (m)		
ELEVA_UL	number(4)	Upper limit of elevation above sealevel (m)		
INTREL_LL	number(4)	Lower limit of internal relief (m)		
INTREL_UL	number(4)	Upper limit of internal relief (m)		
VALDENS	number(4,1)	Valley density; length of valleys/drainage lines per unit area		
DRAINPAT_C	char(2)	Drainage pattern		
		DE	Dendritic	
		PA	Parallel	
		RA	Radial	
		RE	Rectangular	
		SD	Semi - dendritic	
		SP	Sub - parallel	
		TR	Trellised	
GEOFORM_C	char(2)	Geological formation (codes to be established on location)		
PARENMAT_C	char(2)	Parent material (see Annex II for codes)		
PARENAGE_C	char(2)	Age of parent material		
		Q	Quaternary	
		QH	Holocene	
		QP	Pleistocene	
		T	Tertiary	
		TP	Pliocene	
		TM	Miocene	
		TO	Oligocene	
		TE	Eocene	
		TZ	Paleocene	
		M	Mesozioc	
		MC	Cretaceous	
		MJ	Jurassic	
		MT	Triassic	
		P	Paleozoic	
		PP	Permian	
		PC	Carboniferous	
		PD	Devonian	
		PS	Silurian	
		PO	Ordovician	
		PZ	Cambrian	
		C	Precambrian	
		CP	Proterozoic	
		CA	Archaean	
UNESVEG1_C	char(3)	Unesco classification of vegetation, part1 (see Annex II for codes)		
UNESVEG2_C	char(1)	Unesco classification of vegetation, part2 (see Annex II for codes)		
UNESVEG3_C	char(1)	Unesco classification of vegetation, part3 (see Annex II for codes)		
UNESVEG4_C	char(1)	Unesco classification of vegetation, part4 (see Annex II for codes)		
UNESVEG5_C	char(3)	Unesco classification of vegetation, part5 (see Annex II for codes)		
UNESVEG6_C	char(6)	Unesco classification of vegetation, part6 (codes to be established on location)		
LUCLASS_C	char(8)	Land use classification (codes to be established on location)		

Entity : LAND_USE

Land use is described in terms of land use attributes which are grouped into the broad categories of produce (tangible and non-tangible), technology and management aspects. Attributes listed are comparable to the attributes listed under the entity LU_SUBEL. Under the latter entity, aggregated land use data are stored, while under the present entity actual observation point data are stored.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
SURVEYOR_C	char(10)	Surveyor (codes to be established on location)
LANDUSE_C	char(8)	Land use type (codes to be established on location)
PRODUCT1_C	char(3)	First type of production, benefits, amenities
		F Fruits, fibres, resins etc.
		G Game, fish
		L Grazing; browse for livestock
		A Agricultural products
		O Land under fallow
		W Wood products
		C Conservation
		R Recreation
		X Combination of above categories
		O1 Other 1
		O2 Other 2
		O3 Other 3
PRODUCT2_C	char(3)	Second type of production, benefits, amenities
PRODUCT3_C	char(3)	Third type of production, benefits, amenities
SPECROP1_C	char(2)	Name of first species or crop (codes to be established on location)
SPECROP2_C	char(2)	Name of second species or crop
SPECROP3_C	char(2)	Name of third species or crop
YIELD1	number(5)	Estimated yield of first crop
YIELD2	number(5)	Estimated yield of second crop
YIELD3	number(5)	Estimated yield of third crop
YIELDRED_C	char(2)	Yield reducing factors
		WE Weeds
		BI Birds
		GA Game
		LI Livestock
		PD Pests and diseases
		SN Soil nutrient deficiencies
		SD (Other) soil degradational factors
		CL Climatic factors
VISITORS	number(6)	Number of visitors
IMPACT_C	char(2)	Impact on ecosystem
		N None
		S Slight
		M Moderate
		E Severe
LABOUR	number(3)	Labour input in agriculture; number of persons/100ha
MECH_C	char(2)	Rate of mechanization
		H Use of handtools
		A Use of animal traction
		T Use of (communal) tractor
		M Fully mechanized operations
MECHREM	char(150)	Remarks on rate of mechanization
MANURE_L	char(1)	Use of organic manure (Y/N)
FERTUSE_L	char(1)	Application of chemical fertilizers (Y/N)

FERTREM	char(150)	Remarks on kind, amount and frequency of use of fertilizers
BIOCUSE_L	char(1)	Application of biocides (Y/N)
BIOCREM	char(150)	Remarks on kind, amount and frequency of use of biocides
IMPROV_C	char(2)	Forms of land improvement
		IRP Irrigation and drainage infrastructure, project-imposed
		IRT Irrigation and drainage infrastructure, traditional
		TEP Terracing for erosion control, project-imposed
		TET Terracing for erosion control, traditional
		TIP Terracing for irrigation, project-imposed
		TIT Terracing for irrigation, traditional
IMPROVREM	char(150)	Remarks on status of maintenance and efficiency of land improvements
FIELDSIZE	number(5,1)	Order of magnitude of fields (agriculture)
CONCESSIZE	number(4)	Order of magnitude of concessional areas (forestry) (ha)
FIELDREM	char(150)	Remarks on form and orientation of fields/conc. areas
AGRIC_C	char(2)	Intensity of agricultural activities
		SC Shifting cultivation
		BF Semi-permanent or bush/fallow cultivation
		PE Permanent cultivation
INTAGRIC	number(4,1)	Amount of land under actual cultivation (ha/100ha)
AGRICREM	char(150)	Remarks on agricultural activities
FORESTRY_C	char(2)	Harvesting method/felling system in forestry
		A Coppice felling system
		B Shelterwood coppice felling system
		C Copping with standards felling system
		D Clear felling system
		E Shelterwood felling system
		F Shelterwood strip felling system
		G Combinations of the two previous systems
		H Selection felling system
		I Irregular shelterwood felling system
		J Other system (specify) 1
		K Other system (specify) 2
		L Other system (specify) 3
		M Other system (specify) 4
		N Other system (specify) 5
FORREGEN_C	char(2)	Regeneration of forest stands
		AP Artificial regeneration by planting
		AS Artificial regeneration by sowing
		NR Natural regeneration
FORESTREM	char(150)	Remarks on extent, status/age and vigour of regeneration
GRAZING_C	char(2)	Intensity of grazing
		EE Ext. grazing among ext. bush-fallow agricultural practices
		EN Ext. grazing in natural or derived forest ecosystems
		IG Int. grazing on grassl./ext. bush-fallow agricult. pract.
		IP Int. grazing on pasture land
GRAZREM	char(150)	Rem. on grazing practices; type of animal; number of animals/ha
BURNING_C	char(2)	Burning practices
		N No burning
		I Incidental
		S Intentional
BURNREM	char(150)	Remarks on burning practices; reason, extent, frequency and impact

Entity : LU_SUBEL (LAND USE SUB-ELEMENT)

Land use sub-elements are described in terms of land use attributes which are grouped into the broad categories of produce (tangible and non-tangible), technology and management aspects.
Attributes listed are comparable to the attributes listed under the entity LANDUSE. Under the latter entity, observation point data are stored, while under the present entity aggregated land use data are stored.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
LMU_NR	number(3)	Sequence number of Land Mapping Unit
LE_NR	number(2)	Sequence number of Land Element within Land Mapping Unit
SUBEL_NR	number(1)	Sequence number of land-use-sub-element within Land Element
PERC_LE	number(3)	Percentage of Land Element
LANDUSE_C	char(8)	Land use type (codes to be established on location)
PRODUCT1_C	char(3)	First type of production, benefits, amenities
		F Fruits, fibres, resins etc.
		G Game, fish
		L Grazing; browse for livestock
		A Agricultural products
		O Land under fallow
		W Wood products
		C Conservation
		R Recreation
		X Combination of above categories
		O1 Other 1
		O2 Other 2
		O3 Other 3
PRODUCT2_C	char(3)	Second type of production, benefits, amenities
PRODUCT3_C	char(3)	Third type of production, benefits, amenities
SPECROP1_C	char(2)	Name of first species or crop (codes to be established on location)
SPECROP2_C	char(2)	Name of second species or crop
SPECROP3_C	char(2)	Name of third species or crop
SPECROP4_C	char(2)	Name of fourth species or crop
SPECROP5_C	char(2)	Name of fifth species or crop
YIELD1	number(5)	Estimated yield of first crop
YIELD2	number(5)	Estimated yield of second crop
YIELD3	number(5)	Estimated yield of third crop
YIELD4	number(5)	Estimated yield of fourth crop
YIELD5	number(5)	Estimated yield of fifth crop
YIELDRED_C	char(2)	Yield reducing factors
		WE Weeds
		BI Birds
		GA Game
		LI Livestock
		PD Pests and diseases
		SN Soil nutrient deficiencies
		SD (Other) soil degradational factors
		CL Climatic factors
VISITORS	number(6)	Number of visitors
IMPACT_C	char(2)	Impact on ecosystem
		N None
		S Slight
		M Moderate
		E Severe

LABOUR	number(3)	Labour input; number of persons/100ha
MECH_C	char(2)	Rate of mechanization
		H Use of handtools only
		A Use of animal traction
		T Use of (communal) tractor
		M Fully mechanized operations
MECHREM	char(150)	Remarks on rate of mechanization
MANURE_L	char(1)	Use of organic manure (Y/N)
FERTUSE_L	char(1)	Application of chemical fertilizers (Y/N)
FERTREM	char(150)	Remarks on kind, amount and frequency of use of fertilizers
BIOCUSE_L	char(1)	Application of biocides (Y/N)
BIOCREM	char(150)	Remarks on kind, amount and frequency of use of biocides
IMPROV_C	char(2)	Forms of land improvement
		IRP Irrigation and drainage infrastructure, project-imposed
		IRT Irrigation and drainage infrastructure, traditional
		TEP Terracing for erosion control, project-imposed
		TET Terracing for erosion control, traditional
		TIP Terracing for irrigation, project-imposed
		TIT Terracing for irrigation, traditional
IMPROVREM	char(150)	Remarks on status of maintenance and efficiency of land impr.
FIELDSIZE	number(5,1)	Order of magnitude of fields (agriculture) (ha)
CONCESSIZE	number(4)	Order of magnitude of concessional areas (forestry) (ha)
FIELDREM	char(150)	Remarks on form and orientation of fields/conc. areas
AGRIC_C	char(2)	Intensity of agricultural activities
		SC Shifting cultivation
		BF Semi-permanent or bush/fallow cultivation
		PC Permanent cultivation
INTAGRIC	number(4,1)	Amount of land under actual cultivation (ha/100ha)
AGRICREM	char(150)	Remarks on agricultural activities
FORESTRY_C	char(2)	Harvesting method/felling system in forestry
		A Coppice felling system
		B Shelterwood coppice felling system
		C Copping with standards felling system
		D Clear felling system
		E Shelterwood felling system
		F Shelterwood strip felling system
		G Combinations of the two previous systems
		H Selection felling system
		I Irregular shelterwood felling system
		J Other system (specify) 1
		K Other system (specify) 2
		L Other system (specify) 3
		M Other system (specify) 4
		N Other system (specify) 5
FORREGEN_C	char(2)	Regeneration of forest stands
		AP Artificial regeneration by planting
		AS Artificial regeneration by sowing
		NR Natural regeneration
FORESTREM	char(150)	Remarks on extent, status/age and vigour of regeneration
GRAZING_C	char(2)	Intensity of grazing
		EE Ext. grazing among ext. bush-fallow agricultural practices
		EN Ext. grazing in natural or derived forest ecosystems
		IG Int. grazing on grasslands/ext. bush-fallow agricult. pract.
		IP Int. grazing on pasture land
GRAZREM	char(150)	Remarks on grazing practices; type of animal: number of animals/ha
BURNING_C	char(2)	Burning practices
		N No burning
		I Incidental
		S Intentional
BURNREM	char(150)	Remarks on burning practices; reason, extent, frequency and impact

Entity : MSP_ANAL (MINERAL SOIL PROFILE ANALYSIS)

This entity comprises attributes concerning the physical and chemical composition of samples taken in the mineral soil profile pit.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
SAMPDEP_UL	number(3)	Upper limit of sample depth; cm below min. soil surf.
ANALYS1_C	char(10)	Type of analysis (mineral soil)
		F0_2 Clay fraction (%)
		F0_2_WD Water dispersable clay fraction (%)
		F2_20 Fine silt fraction (%)
		F20_50 Silt fraction (%)
		F2_50 Total silt fraction (%)
		F50_100 Very fine sand fraction (%)
		F100_250 Fine sand fraction (%)
		F250_500 Medium sand fraction (%)
		F500_1000 Coarse sand fraction (%)
		F1000_2000 Very coarse sand fraction (%)
		F50_2000 Total sand fraction (%)
		PHH PH - H_2O (1:2.5 susp)
		PHK PH - KCL (1:2.5 susp)
		PHC PH - $CaCL_2$ (1:2.5 susp)
		EC 2.5 Electrical conductivity (1:2.5 susp.)
		ECE Electrical conductivity (saturation extract)
		OC Organic Carbon (Walkley and Black)
		OM Organic Matter (= 2 x OC)
		N Total N (Kjeldahl)
		C/N C/N ratio (C-org/N)
		CA Exch. Ca (AAS)
		MG Exch. Mg (AAS)
		NA Exch. Na (Flame Emission Spect.)
		K Exch. K (Flame Emission Spect.)
		AL Exch. Al (AAS)
		H Exch. H (1M KCL, titr.)
		CEC Cation Exch.Cap (at PH 7, NH4AC)
		ECEC Effect. CEC (Sum Exch.Bases)+Acidity at pH soil)
		BSAT Base saturation (Sum Exch.Bases/ECEC) * 100
		CACO3 CaCO3 eq. (titr. exc. acid.)
		ESP Exch. Sodium Perc. (Exch Na/ECEC) * 100
		PAB 'Available' Phosphorus (Bray + Kurtz)
		PAO 'Available 'Phosphorus (Olsen)
DATELAB	date	Date of analysis (month/day/year)
LAB_C	char(3)	Laboratory identification (codes to be established on location)
VALUE	number(10,3)	Value for a chemical analysis

Entity : MSP_LAY (MINERAL SOIL PROFILE LAYER)

An exhaustive list of soil horizon attributes is incorporated in this entity.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
LAYER_NR	number(2)	Sequence number of layer
HORIZMSP_C	char(6)	Horizon designation (Mineral soil, codes to be established on location)
BOUND_UL	number(6,1)	Upper boundary of horizon; cm below mineral soil surface
BOUND_LL	number(6,1)	Lower boundary of horizon; cm below mineral soil surface
BOUNDW_C	char(1)	Width of lower boundary of horizon (Mineral soil profile) A Abrupt: <2cm C Clear: 2-5cm G Gradual: 5-12cm D Diffuse: >12cm
BOUNDTOP_C	char(1)	Topography of lower boundary of horizon S Smooth: no pockets W Wavy: pockets wider than deep I Irregular: pockets deeper than wide B Broken: boundary discontinuous
HUEDRY_C	char(5)	Hue (Munsell scale) of dry soil
VALDRY_C	char(3)	Value (Munsell scale) of dry soil
CHRDRY_C	char(3)	Chroma (Munsell scale) of dry soil
HUEMOIST_C	char(5)	Hue (Munsell scale) of moist soil
VALMOIST_C	char(3)	Value (Munsell scale) of moist soil
CHRMOIST_C	char(3)	Chroma (Munsell scale) of moist soil
MOTTABUND	number(2)	Abundance of mottles; area percentage
MOTTSIZ_C	char(1)	Size of mottles F Fine: <5mm M Medium: 5-15mm C Coarse: >15mm
MOTTCON_C	char(1)	Contrast of mottles F Faint D Distinct P Prominent
MOTTSHA_C	char(1)	Sharpness of mottles D Diffuse: >2mm C Clear: <2mm S Sharp: knife edge
MOTTHUE_C	char(5)	Hue (Munsell scale) of mottles
MOTTVAL_C	char(3)	Value (Munsell scale) of mottles
MOTTCHR_C	char(3)	Chroma (Munsell scale) of mottles
F0_2_C	char(4)	Estimated texture of fine earth (<2mm) SA Sand CSA Coarse sand MSA Medium sand FSA Fine sand VSA Very fine sand LSA Loamy sand LCSA Loamy coarse sand LMSA Loamy medium sand LFSA Loamy fine sand LVSA Loamy very fine sand SAL Sandy loam CSAL Coarse sandy loam

		MSAL Medium sandy loam
		FSAL Fine sandy loam
		VSAL Very fine sandy loam
		L Loam
		SIL Silt loam
		SI Silt
		SACL Sandy clay loam
		SICL Silty clay loam
		CL Clay loam
		SAC Sandy clay
		SIC Silty clay
		C Clay
		HC Heavy clay
F2_75_C	char(2)	Estimated percentage of gravel (> 2 mm and < 75 mm)
		NG No gravel: <2%
		SG Slightly gravelly: 2-15%
		GR Gravelly: 15-50%
		VG Very gravelly: 50-90%
		GA Gravel: >90%
F75_250_C	char(2)	Estimated percentage of stones (> 75 mm and < 250 mm)
		NS No stones: <2%
		SS Slightly stony: 2-15%
		ST Stony: 15-50%
		VS Very stony: 50-90%
		SO Stones: >90%
F250_C	char(2)	Estimated percentage of boulders (> 250 mm)
		NB No boulders: <2%
		BO Bouldery: 2-50%
		VB Very bouldery: 50-90%
		BL Boulders: >90%
CONSDRY_C	char(2)	Consistence of dry soil
		LO Loose
		SO Soft
		SH Slightly hard
		HA Hard
		VH Very hard
		EH Extremely hard
CONSMOI_C	char(2)	Consistence of moist soil
		LO Loose
		VR Very friable
		FR Friable
		FI Firm
		V Very firm
		EF Extremely firm
STICKY_C	char(2)	Stickiness
		NS Non sticky
		SS Slightly sticky
		S Sticky
		VS Very sticky
PLASTIC_C	char(2)	Plasticity
		NP Non plastic
		SP Slightly plastic
		P Plastic
		VP Very plastic
SMEARY_C	char(2)	Smeariness
		WS Weakly smeary
		MS Moderately smeary
		SS Strongly smeary
		SF Slightly fluid
		VF Very fluid

STRUCGR1_C	char(2)	Structure grade of first structure type WC Structureless - weakly coherent MC Structureless - moderately coherent SC Structureless - strongly coherent WE Weak MO Moderate ST Strong
STRUCSI1_C	char(2)	Structure size of first structure type VF Very fine FI Fine ME Medium CO Coarse VC Very coarse
STRUCTY1_C	char(2)	First structure type PL Platy PR Prismatic CL Columnar AB Angular blocky SB Subangular blocky AW Wedge shaped GR Granular CR Crumb MA Massive PM Porous massive SG Single grain IR Irregular
STRUCGR2_C	char(2)	Structure grade of second structure type
STRUCSI2_C	char(2)	Structure size of second structure type
STRUCTY2_C	char(2)	Second structure type
STRUCREL_C	char(1)	Relation between first and second structure (codes to be established on location)
CUTQUAN1_C	char(1)	Quantity of first type of cutans N None P Patchy B Broken C Continuous
CUTTHIC1_C	char(1)	Thickness of first type of cutans F Thin (faint) M Moderate (distinct) T Thick (prominent)
CUTKIND1_C	char(1)	Kind of first type of cutans C Clay F Iron oxide H Humus M Manganese oxide P Slickenside Q Silica R Pressure face S Sesquioxides Z Salts
CUTLOC1_C	char(2)	Location of first type of cutans CF On coarse fragments LA As lamallae (Clay bands) NS Unspecified P On pedfaces PH On horizontal pedfaces PV On vertical pedfaces VO In voids (pores)
CUTQUAN2_C	char(1)	Quantity of second type of cutans
CUTTHIC2_C	char(1)	Thickness of second type of cutans

CUTKIND2_C	char(1)	Kind of second type of cutans
CUTLOC2_C	char(2)	Location of second type of cutans
PORESIZ1_C	char(1)	Size of first type of pores
		I Micro: <0.1mm
		V Very fine: 0.1-1mm
		F Fine: 1-2mm
		M Medium: 2-5mm
		C Coarse: 5-10mm
		A Very coarse: >10mm
POREABU1_C	char(1)	Abundance of first type of pores
		N None
		F Few: 1-50/dm^2
		C Common: 50-200/dm^2
		M Many: >200/dm^2
PORESIZ2_C	char(1)	Size of second type of pores
POREABU2_C	char(1)	Abundance of second type of pores
POROSITY	char(70)	General description of porosity
ROOTSIZ1_C	char(1)	Size of first type of roots
		V Very fine: <1mm
		F Fine: 1-2mm
		M Medium: 2-10mm
		C Coarse: 10-25mm
		O Very coarse: >25mm
ROOTABU1_C	char(1)	Abundance of first type of roots per unit area (i.e. per 2.5x2.5cm for v.fine and fine; 25x25cm for coarser roots)
		V Very few: <3
		F Few: 3-10
		C Common: 10-20
		M Many: 20-30
		A Abundant: >30
ROOTORI1_C	char(1)	Orientation of first type of roots
		H Horizontal
		O Oblique
		V Vertical
		R Random
ROOTSIZ2_C	char(1)	Size of second type of roots
ROOTABU2_C	char(1)	Abundance of second type of roots per unit area
ROOTORI2_C	char(1)	Orientation of second type of roots
ROOTFINE	number(4)	Dry weight of fine roots (diam. <5mm) per sampled area (g)
ROOTCOARS	number(4)	Dry weight of coarse roots (diam. >5mm) per sampled area (g)
ROCKSIZ1_C	char(1)	Size of first type of rock fragments
		F Fine gravel: 0.2-1cm
		G Gravel: 1-7.5cm
		S Stones: 7.5-25cm
		B Boulders: 25-50cm
		R Blocks: >50cm
ROCKABU1_C	char(1)	Abundance of first type of rock fragments
		N None
		F Few: 2-15%
		M Many: 15-50%
		A Abundant: >50%
ROCKWEA1_C	char(1)	Degree of weathering of first type of rock fragments
		F Fresh
		W Slighly weathered
		S Strongly weathered
ROCKNAT1_C	char(2)	Nature of first type of rock fragments (see Annex II for codes)
ROCKSIZ2_C	char(1)	Size of second type of rock fragments
ROCKABU2_C	char(1)	Abundance of second type of rock fragments
ROCKWEA2_C	char(1)	Degree of weathering of second type of rock fragments

ROCKNAT2_C	char(2)	Nature of second type of rock fragments		
CONCQUA1_C	char(1)	Quantity of first type of concretions		
		N	None	
		V	Very few:	<5%
		F	Few:	5-15%
		Q	Frequent:	15-40%
		R	Very frequent:	40-80%
		D	Dominant:	>80%
CONCSIZ1_C	char(1)	Size of first type of concretions		
		P	Powdery:	diffuse
		S	Small:	<1cm
		L	Large:	>1cm
CONCHAR1_C	char(1)	Hardness of first type of concretions		
		H	Hard	
		S	Soft	
CONCSHA1_C	char(1)	Shape of first type of concretions		
		A	Angular	
		I	Irregular	
		S	Spherical	
CONCNAT1_C	char(1)	Nature of first type of concretions		
		C	Argillaceous	
		F	Ferruginous	
		K	Calcareous	
		M	Manganiferous	
		Q	Siliceous	
		Y	Gypsiferous	
		Z	Saline	
CONCQUA2_C	char(1)	Quantity of second type of concretions		
CONCSIZ2_C	char(1)	Size of second type of concretions		
CONCHAR2_C	char(1)	Hardness of second type of concretions		
CONCSHA2_C	char(1)	Shape of second type of concretions		
CONCNAT2_C	char(1)	Nature of second type of concretions		
CARBOCON_C	char(1)	Content of carbonates; intensity of reaction to HCL (10%)		
		N	Non calcareous:	no reaction visible
		S	Slightly calcareous:	slight reaction
		R	Calcareous:	strong reaction
		V	Strongly calcareous:	violent reaction
CARBOLOC_C	char(1)	Location of carbonates		
		C	In pores, rootchannels and holes	
		L	Locally	
		N	On nodules	
		O	On coarse fragments	
		S	On ped faces	
		T	Throughout	
PH_H2O	number(4,1)	pH_$H_2$0		
PH_KCL	number(4,1)	pH_KCL		
EC	number(6,3)	Electric conductivity (mS/cm)		
SAMP_L	char(1)	Sample taken (Y/N)		

Entity : MSP_PIT (MINERAL SOIL PROFILE PIT)

Mineral soil profiles are described in detail in MSP_LAY (mineral soil profile layer). This entity contains attributes concerning soil classification.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
DATE	date	Date of observation (month/day/year)
SURVEYOR_C	char(10)	Surveyor (codes to be established on location)
SOILTYPE_C	char(3)	Soil type (codes to be established on location)
SOILTAX1_C	char(3)	Classification according to Soil Taxonomy(1987); great group (see Annex II for codes)
SOILTAX2_C	char(4)	Classification according to Soil Taxonomy (1987); subgroup (see Annex II for codes)
SOILTAX3_C	char(3)	Classification according to Soil Taxonomy(1987); family code (see Annex II for codes)
FAOSOIL1_C	char(3)	Classification according to FAO/Unesco legend (soil unit) (see Annex II for codes)
FAOSOIL2_C	char(3)	Classification according to FAO/Unesco legend (third level) (see Annex II for codes)
ORSTOM	char(75)	Classification according to ORSTOM system (codes to be established on location)
LOCALSOIL	char(75)	Classification according to local system (codes to be established on location)
PHASE_C	char(2)	Soil phase AN Anthraquic DU Duripan FR Fragipan GE Gelundic GI Gilgai IN Inundic LI Lithic PF Petroferric PH Phreatic PL Placic RU Rudic SA Salic SK Skeletic SO Sodictic TK Takyric YR Yermic
DIAGPROP_C	char(2)	Diagnostic properties (codes to be established on location)

Entity : MSP_SAMP (MINERAL SOIL PROFILE SAMPLE)

This entity describes the mineral soil profile samples taken in a mineral soil profile pit.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
SAMPDEP_UL	number(3)	Upper limit of sample depth; cm below mineral soil surface
SAMPDEP_LL	number(3)	Lower limit of sample depth; cm below mineral soil surface

Entity : OBS_SITE (OBSERVATION SITE)

This entity contains, besides coordinates and a number of key attributes, so-called logical attributes which are used to store information about the type of observations made at a specific site.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
XCOOR	char(10)	X coordinate (degrees, minutes, seconds)
YCOOR	char(10)	Y coordinate (degrees, minutes, seconds)
PHOTOSY1_C	char(6)	Mapping unit symbol for physiographic unit on photo interpretation map (codes to be established on location)
PHOTOSY2_C	char(6)	Mapping unit symbol for vegetation on photo interpretation map (codes to be established on location)
LMU_NR	number(3)	Sequence number of Land Mapping Unit
LE_NR	number(2)	Sequence number of Land Element within Land Mapping Unit
SITEATT_L	char(1)	Site attributes (Y/N)
VEGREL_L	char(1)	Vegetation relevee (Y/N)
L_USE_L	char(1)	Landuse relevee (Y/N)
HP_PIT_L	char(1)	Humus profile pit (Y/N)
MSP_PIT_L	char(1)	Mineral soil profile pit (Y/N)
AUGER_L	char(1)	Augering (Y/N)
REMARKS	char(150)	Description of observation site

Entity : SITEDESC (SITE DESCRIPTION)

Attributes of an observation site concerning surface form, drainage conditions, micro relief, surface conditions, degree of erosion and biological activity are incorporated in this entity.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
DATE	date	Date of observation (month/day/year)
SURVEYOR_C	char(10)	Surveyor (codes to be established on location)
ALTITUDE	number(4)	Altitude, in meters above sea level
POSITION_C	char(1)	Position in catena T Crest/hilltop U Upper slope M Middle slope L Lower slope B Valley bottom
EXPO_C	char(3)	Exposition to point of compass N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW
SLOFORM_C	char(1)	Slope form S Straight V Convex C Concave F Straight segments-convex K Straight segments-concave Z Convex/concave I Irregular O Other
SLOGRADIEN	number(3)	Slope gradient; measured value (%)
SLOGRAD_LL	number(3)	Lower limit of slope gradient (%)
SLOGRAD_UL	number(3)	Upper limit of slope gradient (%)
SLOLENGTH	number(4)	Slope length; measured or estimated value (m)
SLOLEN_LL	number(4)	Lower limit of slope length (m)
SLOLEN_UL	number(4)	Upper limit of slope length (m)
LOPARENT_C	char(2)	Local parent material (see Annex II for codes)
FLOODREM	char(75)	Remarks on flooding or indications of flooding
FLOODW_EC	number(5,2)	Electric conductivity of floodwater (mS/cm)
SURFDRAI_C	char(1)	Surface drainage class P Ponded: area waterlogged for more than one month S Slow: waterlogging not more than one month M Medium: no waterlogging for more than 48 hours

		R Rapid: excessive water drains rapidly, even with heavy rains
		A Very rapid: soil cannot ensure topsoil moisture for seed germination
INFILCAP	number(4)	Infiltration capacity (mm/h)
PERMEA	number(4,1)	Measured value of permeability
PERMEA_LL	number(4,1)	Lowest measured value of permeability (cm/h)
PERMEA_UL	number(4,1)	Highest measured value of permeability (cm/h)
PERMEA_C	char(1)	Estimated permeability class
		S Slow <0.5cm/h
		M Moderate 0.5-15cm/h
		R Rapid >15cm/h
SOILDRAI_C	char(1)	Internal soil drainage class
		V Very poorly drained
		P Poorly drained
		I Imperfectly drained
		M Moderately well drained
		W Well drained
		R Somewhat excessively drained
		X Excessively drained
SOILDRY_LL	number(3)	Lower limit of dry soil; depth below surface (cm)
SOILMOI_LL	number(3)	Lower limit of moist soil; depth below surface (cm)
SOILWET_LL	number(3)	Lower limit of wet soil; depth below surface (cm)
GRWLEV_C	char(2)	Groundwater level class
		PD Always deeper than 200cm below surface
		TN Temporarily 100-200cm below surface
		PN Permanently 100-200cm below surface
		TH Temporarily less than 100cm below surface
		PH Permanently less than 100cm below surface
		DM Mottling deeper than 100cm below surface
		MM Mottling between 50 and 100cm below surface
		SM Mottling within 50cm below surface
GRWDEPTH	number(3)	Groundwater table; measured depth below surface (cm)
GRWDEP_LL	number(3)	Lowest groundwater table: estim. depth below surface (cm)
GRWDEP_UL	number(3)	Highest groundwater table: estim. depth below surface (cm)
GRW_EC	number(6)	Electric conductivity of groundwater (mS/cm)
GRWORIG_C	char(1)	Groundwater origin
		P Perched
		R Real
		S Seepage
STONECOVER	number(3)	Estimated cover percentage of surface stones
STONEDIST	number(4,1)	Estimated average distance of surface stones
STONESI_LL	number(4.1)	Minimum diameter of commonest surface stones (cm)
STONESI_UL	number(4.1)	Maximum diameter of commonest surface stones (cm)
STONENAT_C	char(2)	Nature of surface stones (see Annex II for codes)
STONEORI_C	char(2)	Origin of surface stones (codes to be established on location)
ROCKCOVER	number(3)	Estimated cover percentage of rock outcrops
ROCKDIST	number(3)	Estimated average distance of rock outcrops (m)
HEIGHTVAR	number(3)	Micro-relief; average height variation (cm)
HEIGHTV_LL	number(3)	Micro-relief; minimum height variation (cm)
HEIGHTV_UL	number(3)	Micro-relief; maximum height variation (cm)
LATERVAR	number(3)	Micro-relief; lateral dimensions (distance between tops or depressions, in cm)
LATERV_LL	number(3)	Micro-relief; minimum lateral dimensions (cm)
LATERV_UL	number(3)	Micro-relief; maximum lateral dimensions (cm)
MORPHO_C	char(1)	Morphological features of microrelief (more codes to be established at location)
		D Dimples
		G Gilgai
		N Animal tracks

		S Slumping
		T Terracettes
CRACKWI_LL	number(4,1)	Minimum width of surface cracks (cm)
CRACKWI_UL	number(4,1)	Maximum width of surface cracks (cm)
CRACKDE_LL	number(3)	Minimum depth of surface cracks (cm)
CRACKDE_UL	number(3)	Maximum depth of surface cracks (cm)
CRACKDI_LL	number(3)	Minimum distance between surface cracks (cm)
CRACKDI_UL	number(3)	Maximum distance between surface cracks (cm)
CRUSTCON_C	char(2)	Consistence of crust
		SO Soft
		SH Slightly hard
		HA Hard
		VH Very hard
CRUST_C	char(1)	Presence of crusting
		N Unslaked
		P Partly slaked
		S Slaked
		C Capped
CRUSTNAT_C	char(2)	Nature of crusting
		CA Crust by algae
		CO Crust of (slaked) overwash
		SS Sealing in denuded subsurface horizon
CRUSTTHICK	number(2)	Thickness of crusting (mm)
TERMCOVER	number(3)	Percentage of area covered with termite mounds
ANTCOVER	number(3)	Percentage of area covered with ant heaps
TERMANTREM	char(75)	Remarks on size, form, colour of termite mounds and ant heaps
SHEET_LL	number(3)	Estimated minimum percentage of surface affected by sheet erosion
SHEET_UL	number(3)	Estimated maximum percentage of surface affected by sheet erosion
RILL_LL	number(3)	Estimated minimum percentage of surface affected by rill erosion
RILL_UL	number(3)	Estimated maximum percentage of surface affected by rill erosion
GULLY_LL	number(3)	Estimated minimum percentage of surface affected by gully erosion
GULLY_UL	number(3)	Estimated maximum percentage of surface affected by gully erosion
SLOSTAB_C	char(1)	Slope stability and mass wasting
		N Stable: surface not affected
		U Locally unstable: 0-5% affected
		M Moderately unstable: 5-20% affected
		H Highly unstable: >20% surface affected
OWASH_LL	number(3)	Estimated minimum percentage of area with recent water erosion products
OWASH_UL	number(3)	Estimated maximum percentage of area with recent water erosion products
HUMPRO	number(3)	Average thickness of humus profile
HUMPRO_LL	number(3)	Minimum thickness of humus profile
HUMPRO_UL	number(3)	Maximum thickness of humus profile
SOLUM	number(3)	Average thickness of solum (cm)
SOLUM_LL	number(3)	Minimum thickness of solum (cm)
SOLUM_UL	number(3)	Maximum thickness of solum (cm)
PAN	number(3)	Average depth of hardpan (cm)
PAN_LL	number(3)	Minimum depth of hardpan (cm)
PAN_UL	number(3)	Maximum depth of hardpan (cm)
PANTYPE_C	char(1)	Type of hardpan
		C Clay pan
		F Fragipan
		D Duripan
		K Petrocalcic horizon
		Y Gypsic horizon
		L Petroplinthite
		P Plough pan
		X Others
PANHARD_C	char(1)	Hardness of hardpan

		W	Weakly cemented
		S	Strongly cemented
		I	Indurated
PANCONT_C	char(1)	Continuity of hardpan	
		B	Broken
		D	Discontinuous
		C	Continuous
PANSTRUC_C	char(1)	Structure of hardpan	
		M	Massive
		L	Platy
		V	Vesicular
		N	Nodular
		P	Pisolithic
BIOABUND_C	char(1)	Abundance of biological activity	
		O	Nil
		F	Few
		Q	Frequent
		R	Very frequent
BIOKIND_C	char(1)	Kind of biological activity	
		A	Animal channels
		C	Sclerotium
		K	Krotovina's
		M	Mounds
		P	Coprogenic elements
		R	Termite channels
		S	Shells
		T	Pedotubules
		W	Worm channels
		X	Channels, unspecified
		Y	Mycelium

Entity : SUR_AREA (SURVEY AREA)

In this entity, the survey area is described in general terms with attributes like area name, country name, area, coordinates and project name.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
AREA_NAME	char(75)	Name of the survey area
COUNTRY	char(75)	Country name
GENDESC	char(225)	General description of the survey area
AREA	number(7)	Area (ha)
LATITU_LL	char(6)	Lower limit of latitude (degrees)
LATITU_UL	char(6)	Upper limit of latitude (degrees)
LONGITU_LL	char(7)	Lower limit of longitude (degrees)
LONGITU_UL	char(7)	Upper limit of longitude (degrees)
PROJNAME	char(75)	Project name
PROJDESC	char(150)	Project description

Entity : VEG_RELE (VEGETATION RELEVEE)

In this entity vegetation characteristics are recorded. This entity contains administrative and general structural attributes; and aggregated data, such as vegetation classification.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
DATE	date	Date of observation (month/day/year)
SURVEYOR_C	char(10)	Surveyor (codes to be established on location)
SURV_BOT_C	char(10)	Local botanist/informant
RELEVSIZE	number(4)	Size of vegetation relevee (m^2)
RELEQUAL_C	char(1)	Quality and intensity of relevee C Relevee complete acc. to survey scale I Incomplete relevee; compulsory attributes registered; no optional attr. Q "Quick look" relevee; no attributes registered; obs.point for groundtruth confirmation only
AERCOVER	char(2)	Percentage external foliage cover
DENSITY_70	number(5)	Number of trees >70cm DBH (per ha)
DENSITY_30	number(5)	Number of trees >30cm DBH (per ha)
DENSITY_10	number(5)	Number of trees >10cm DBH (per ha)
STEMCOVER	number(3)	Stem or basal cover (m^2/ha) of trees >10cm
VOLUME	number(7,1)	Estimated volume of timber (m^3/ha)
STRUCREM	char(75)	Remarks on stucture of vegetation
UNESVEG1_C	char(3)	Unesco classification of vegetation, part1 (see Annex II for codes)
UNESVEG2_C	char(1)	Unesco classification of vegetation, part2 (see Annex II for codes)
UNESVEG3_C	char(1)	Unesco classification of vegetation, part3 (see Annex II for codes)
UNESVEG4_C	char(1)	Unesco classification of vegetation, part4 (see Annex II for codes)
UNESVEG5_C	char(3)	Unesco classification of vegetation, part5 (see Annex II for codes)
UNESVEG6_C	char(6)	Unesco classification of vegetation, part6 (codes to be established on location)
VEGTYP1_C	char(3)	Vegetation type, structural, local typification (codes to be established on location)
VEGTYP2_C	char(3)	Vegetation type, floristic, local typification (codes to be established on location)
SPEC_RI_F	number(3)	Species richness: number of Families represented
SPEC_RI_G	number(3)	Species richness: number of Genera represented
SPEC_RI_S	number(3)	Species richness: number of Species represented

Entity : VEG_SPEC (VEGETATION SPECIES)

This entity records the species at a relevee. These are described in terms of abundance, height, volume, stage, age, vitality and use.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
NAME_NR	number(4)	Sequence number of species within this Vegetation Relevee
FIELDNAME	char(16)	Provisional species name for survey purpose only
NAME_REM	char(60)	Remark on species
LATNAME	char(9)	Scientific name of species, abbrev.: genus(4);.(1);spec(4)
LOCNAME	char(8)	Local, indigenous name of species
LAYER_NR	number(2)	Sequence number of layer (see structure)
ABUND_C	char(2)	Abundance class
		R Rare, cover less than 5%
		F Few, cover less than 5%
		M Many, cover less than 5%
		A Abundant, cover less than 5%
		1 Cover about 10% (number irrelevant)
		2 Cover about 20% (number irrelevant)
		3 Cover about 30% (number irrelevant)
		4 Cover about 40% (number irrelevant)
		5 Cover about 50% (number irrelevant)
		6 Cover about 60% (number irrelevant)
		7 Cover about 70% (number irrelevant)
		8 Cover about 80% (number irrelevant)
		9 Cover about 90% (number irrelevant)
		10 Cover about 100% (number irrelevant)
HEIGHT	number(4,1)	Estimated height (m)
VOLUME	number(7,1)	Estimated volume of timber (m^3/ha)
REPROD_C	char(1)	Reproductional stage
		V Vegetative
		B Flowering
		F in Fruit
		X Flowers and fruits
DECIDU_C	char(1)	Status deciduous species
		L In leaf
		S Without leaves
AGE_C	char(1)	Growth stage of species
		J Species occurs only as seedling/sapling or juvenile
		Y Young, not yet fully grown
		M Mature, fully grown
VITAL_C	char(1)	Vitality
		H Healthy
		A Unhealthy
		O Dying
		D Dead
USEPART1_C	char(2)	First part of species used
		LE Leaf
		TW Twig
		BA Bark
		WO Wood
		BU Bud
		FL Flower
		FR Fruit
		SE Seed
		RO Root

		TU Tuber
		JU Juice, resin
USEPURP1_C	char(2)	Purpose, type of use of first part of species
		FO Food, beverage
		FU Fuel, firewood
		ME Medicine, poison
		IN Insect repellent, scent, perfume
		DE Decoration
		TI Timber, construction
		TO Tool, weapon
USEPART2_C	char(2)	Second part of species used
USEPURP2_C	char(2)	Purpose, type of use of second part of species
USEPART3_C	char(2)	Third part of species used
USEPURP3_C	char(2)	Purpose, type of use of third part of species

Entity : VEG_STRU (VEGETATION STRUCTURE)

Vegetation structure is characterized by the presence, height, pattern and cover of various strata. Within a vegetation layer, several growth forms are recorded.

Attribute	Type	Description
AREA_ID	char(7)	Identification of survey area
OBS_NR	number(4)	Sequence number of observation site within survey area
LAYER_NR	number(1)	Sequence number of layer
LAYER_C	char(2)	Layer in vegetation
		E Emergents, solitary trees emerging above general forest canopy
		C Tree layer; possibly to be subdivided into:
		CU Upper canopy, and
		CL Lower canopy, if clearly present
		S Shrub layer, incl. saplings
		H Herb layer; possibly to be subdivided into:
		HT Tall herb layer
		HL Low herb layer
HEIGHT_AV	number(4,1)	Estimated average heigt (m) of layer
HEIGHT_UL	number(4,1)	Estimated average maximum height (m) of layer
HEIGHT_LL	number(4,1)	Estimated average minimum height (m) of layer
COVER	number(3)	Percentage cover of layer
ABUND1_C	char(2)	Abundance class first growth form in layer
		1 Cover about 10% (number irrelevant)
		2 Cover about 20% (number irrelevant)
		3 Cover about 30% (number irrelevant)
		4 Cover about 40% (number irrelevant)
		5 Cover about 50% (number irrelevant)
		6 Cover about 60% (number irrelevant)
		7 Cover about 70% (number irrelevant)
		8 Cover about 80% (number irrelevant)
		9 Cover about 90% (number irrelevant)
		10 Cover about 100% (number irrelevant)
GRFORM1_C	char(2)	First growth form (Others to be established at location)
		AF Acaulescent fern
		AH Aphyllous herb
		AT Aphyllous tree (casuarina)
		AV Aphyllous vine
		BH Broadleaf herb (forb)
		BL Broadleaf liana
		BS Broadleaf shrub
		BV Broadleaf vine
		CB Climbing bamboo
		CF Climbing fern
		CH Cushion herb
		DT Deciduous broadleaf tree
		ET Evergreen broadleaf tree
		FE Fern epiphyte
		GA Giant aroid
		GH Graminoid herb
		GV Graminoid vine
		HE Broadleaf herbaceous epiphyte
		PL Palmoid liana
		PS Pachycaul scrub
		PT Pachycaul tree
		RS Rosette scrub

		RT Rosette tree (pandan)
		SE Scrub epiphyte
		SF Strangling fig
		SP Scrub-palmoid
		TB Tufted bamboo
		TG Tussock graminoid
		TP Tree-palmoid
ABUND2_C	char(2)	Abundance class second growth form
GRFORM2_C	char(2)	Second growth form
ABUND3_C	char(2)	Abundance class third growth form
GRFORM3_C	char(2)	Third growth form
ABUND4_C	char(2)	Abundance class fourth growth form
GRFORM4_C	char(2)	Fourth growth form
ABUND5_C	char(2)	Abundance class fifth growth form
GRFORM5_C	char(2)	Fifth growth form

ANNEX II

CODES

TABLE II.1 UNESCO VEGETATION CLASSIFICATION, SELECTED VEGETATION TYPES

Source: UNESCO, 1973

I, II, III, IV, V:	ATTRIBUTE UNESVEG1_C
A, B, C, D, E:	ATTRIBUTE UNESVEG2_C
1, 2, 3, 4, 5:	ATTRIBUTE UNESVEG3_C
a, b, c, d, e, f, g, h:	ATTRIBUTE UNESVEG4_C
(1), (2), (3), (4):	ATTRIBUTE UNESVEG5_C

I	Closed forest
I.A	Mainly evergreen forest
I.A.1	Tropical ombrophilous forest
I.A.1a	Tropical ombrophilous lowland forest
I.A.1b	Tropical ombrophilous submontane forest
I.A.1c	Tropical ombrophilous montane forest
I.A.1c(1)	Broad-leaved
I.A.1c(2)	Needle-leaved
I.A.1c(3)	Microphyllous
I.A.1c(4)	Bamboo
I.A.1d	Tropical ombrophilous subalpine forest
I.A.1e	Tropical ombrophilous cloud forest
I.A.1e(1)	Broad-leaved
I.A.1e(2)	Needle-leaved
I.A.1e(3)	Microphyllous
I.A.1f	Tropical ombrophilous alluvial forest
I.A.1f(1)	Riparian forest, frequently flooded
I.A.1f(2)	Occasionally flooded
I.A.1f(3)	Seasonally water-logged for several months
I.A.1g	Tropical ombrophilous swamp forest
I.A.1g(1)	Broad-leaved
I.A.1g(2)	Dominated by palms
I.A.1h	Tropical evergreen bog forest
I.A.2	Tropical and subtropical evergreen seasonal forest
I.A.2a	Tropical or subtropical evergreen seasonal lowland forest
I.A.2b	Tropical or subtropical evergreen seasonal submontane forest
I.A.2b(1)	Broad-leaved
I.A.2b(2)	Needle-leaved
I.A.2c	Tropical or subtropical evergreen seasonal montane forest
I.A.2d	Tropical or subtropical evergreen dry "subalpine" forest
I.A.3	Tropical and subtropical semi-deciduous forest
I.A.3a	Tropical or subtropical semi-deciduous lowland forest
I.A.3b	Tropical or subtropical semi-deciduous montane or cloud forest
I.A.4	Subtropical ombrophilous forest
I.A.5	Mangrove forest
I.A.9	Tropical or subtropical evergreen needle-leaved forest
I.A.9a	Tropical/sub- lowland/submontane evergreen needly-leaved forest
I.A.9b	Tropical/sub- montane/subalpine evergreen needly-leaved forest
I.B	Mainly deciduous forest
I.B.1	Tropical and subtropical drought-deciduous forest
I.B.1a	Drought-deciduous broad-leaved lowland and submontane forest
I.B.1b	Drought-deciduous montane (and cloud) forest
II	Woodland
II.A	Mainly evergreen woodland

annex II-2

II.A.1	Evergreen broad-leaved woodland
II.B	Mainly deciduous woodland
II.B.1	Drought-deciduous woodland
III	Scrub
III.A	Mainly evergreen scrub
III.A.1	Evergreen broad-leaved shrubland
III.A.1a	Low bamboo thicket
III.A.1b	Evergreen tuft-tree shrubland
III.A.1c	Evergreen broad-leaved hemisclerophyllous thicket
III.A.1d	Evergreen broad-leaved sclerophyllous shrubland
III.A.1e	Evergreen suffruticose thicket
III.A.2b	Evergreen microphyllous shrubland
III.B	Mainly deciduous scrub
III.B.1	Drought-deciduous scrub with evergreen woody plants admixed
III.B.2	Drought-deciduous scrub without evergreen woody plants admixed
IV	Dwarf-scrub and related communities
IV.A	Mainly evergreen dwarf-scrub
IV.A.1	Evergreen dwarf-scrub thicket
IV.A.1a	Evergreen caespitose dwarf-shrub thicket
IV.A.1b	Evergreen creeping or matted dwarf-shrub thicket
V	Herbaceous vegetation
V.A	Tall graminoid vegetation
V.A.1	Tall grassland with a tree synusia covering
V.A.1a	Woody synusia broad-leaved evergreen
V.A.1b	Woody synusia broad-leaved semi-evergreen
V.A.1c	Woody synusia broad-leaved deciduous
V.A.1c(1)	Seasonally flooded
V.A.2	Tall grassland with a tree synusia covering less than 10 %
V.A.2d	Trop. or subtrop. tall grassl. with trees and/or shrubs growing in tufts on termite nests
V.A.3	Tall grassland with synusia of shrubs
V.A.4	Tall grassland with woody synusia consist mainly of tuft plants
V.A.4a	Tropical grassland with palms
V.A.4a(1)	Seasonally flooded
V.A.5	Tall grassland, practically without woody synusia
V.A.5a	Tropical grassland
V.A.5a(1)	Seasonally flooded
V.A.5a(2)	Wet or flooded most of the year
V.B	Medium tall grassland
V.B.4	Medium tall grassland with an open synusia of tuft plants
V.B.4a	Medium tall subtropical grassland with open groves of palms
V.B.4a(1)	Seasonally flooded
V.B.5	Medium tall grassland, practically without woody synusia
V.B.5a	Medium tall grassland consistinf mainly of sod grasses
V.B.5a(1)	Wet or flooded most of the year
V.B.5a(2)	On sandy soil or dunes
V.B.5b	Medium tall grassland consisting mainly of bunch grasses
V.C	Short grassland
V.C.5a	Trop. alpine open to closed bunch-grass communities w. woody synusia or tuft plants
V.D	Forb vegetation
V.D.1	Tall forb communities
V.D.1a	Mainly perennial flowering forbs. and ferns
V.D.1a(1)	Saline substrate, and or wet much of the year
V.D.1b	Fern thickets

V.D.1c	Mainly annual forbs
V.E	Hydromorphic fresh-water vegetation
V.E.1	Rooted fresh-water communities
V.E.1a	Tropical and subtropical forb formations
V.E.2	Free-floating fresh-water communities
V.E.2a	Tropical and subtropical free-floating formations

annex II-4

TABLE II.2 CLASSIFICATION OF PARENT MATERIAL

Source: Meijerink, 1988 (adapted)

ATTRIBUTES: PARENMAT_C, LOPARENT_C, STONENAT_C, ROCKNAT1_C, ROCKNAT2_C

c	Clay
si	Silt
s	Sand
g	Gravel
b	Boulder
lv	Unconsilidated sheel sand and shell gravel; coquina; bed predominately composed of fossils
lr	Reef organisms and debris, coral sand, unconsolidated
lm	Marl
G	Rudites (coarse particles dominant)
GC	Conglomerate
GA	Conglomerate arkose
GB	Breccia
S	Arenites (sand fraction dominant)
SS	Sandstone in general, undifferentiated
SN	Sandstone, sandstone with siliceous cement, grit
SA	Arkose
SW	Greywacke
SG	Conglomeratic sandstone
SC	Argillaceous sandstone
SD	Calcareous sandstone
SK	Carbonaceous sandstone
ST	Tuffaceous sandstone
SF	Ferruginous sandstone
C	Lutites, pelites, pulverites (clay or silt fraction dominant)
Cl	Siltstone
CU	Mudstone, claystone: homogeneous, consolidated
CS	Shale: stratified, consolidated
FC	Argillaceous (clayey or shaly) formation
FI	Silty formation
CK	Carbonaceous shale
L	Carbonate rocks
LI	Limestone in general, stratified
LE	Limestone in general, not stratified
LX	Aphanitic limestone (micro or crypto-crystalline texture)
LV	Fossil-fragment limestone, coquinite, coquinoid limestone
LT	Detrital limestone
LG	Limestone conglomerate
LB	Limestone breccia
LR	Reef limestone
LO	Oolitic limestone
LP	Pisolitic limestone
LS	Pseudo-oolitic limestone, pellet limestone, limesandstone
LX	Crystalline (recrystallized) limestone
JJ	Chalk
LJ	Chalky limestone
DL	Dolomite
LD	Dolomitic limestone

annex II-6

LM	Marl
FM	Marly formation
FL	Calcareous formation
FD	Dolomitic formation
LS	Sandy limestone
LC	Argillaceous limestone
K	Coals, bitumens and related rocks
KK	Coal in general
KB	Thin coal bed
KW	Brown coal
KP	Peat
FK	Carbonaceous formation, coal streaks
KG	Coal conglomerate
KV	Plant remains
FB	Bitumen, bituminous formation in general
CB	Bituminous shale (including oil shale)
E	Evaporites (Salinastones)
EY	Gypsum
FY	Gypsiferous formation
EN	Anhydrite, rock salt in general
FN	Anhydrite formation
EP	Saliferous formation, salt hoppers
B	Basement
BB	Basement in general, undifferentiated
BX	Folded basement
I	Plutonic rocks
IN	Intrusive rocks in general
IA	Granite group, acid
ID	Diorite-syenite group, intermediate
IB	Gabbro group, basic
IP	Peridotite group, ultrabasic
H	Hypabyssal rocks
HA	Porphyry, acid
HB	Porphyry, intermediate to ultrabasic
VV	Extrusive rocks in general
VR	Liparite, dacite, rhyolite
VA	Andesite, trachyte, phonolite
VB	Basalt, diabase, dolerite
TT	Pyroclastic rocks, fine-grained tuffs
TA	Pyroclastic rocks, fine-grained tuffs, acid
TD	Pyroclastic rocks, fine-grained tuffs, interm.
TB	Pyroclastic rocks, fine-grained tuffs, basic
PA	Pyroclastic rocks, coarse grained, acid
PD	Pyroclastic rocks, coarse grained, interm.
PB	Pyroclastic rocks, coarse grained, basic
FT	Tuffaceous formation
OP	Ophiolitic association, ophiolite
XD	Dikes in general
M	Metamorphic rocks
MM	Metamorphic rocks in general
MO	Contact-metamorphic sandstone
MC	Slate, phyllite
MQ	Quartzite

MG	Gneiss, acid
ML	Marble
MI	Gneiss, intermediate
MT	Calc-silicate rocks
MS	Schist (mica, chlorite, talc schist, etc)
MP	Serpentinite
MF	Gneiss rich in ferromagnesian minerals
MA	Amphibolite, eclogite
MB	Magmatitic rock

annex II-8

TABLE II.3 CLASSIFICATION ACCORDING TO FAO/UNESCO SOIL CLASSIFICATION SYSTEM

Source: FAO, 1988

ATTRIBUTE: FAOSOIL1_C

AC	Acrisols
ACF	Ferric Acrisol
ACG	Gleyic Acrisol
ACH	Haplic Acrisol
ACP	Plinthic Acrisol
ACU	Humic Acrisol
AL	Alisols
ALF	Ferric Alisol
ALG	Gleyic Alisol
ALH	Haplic Alisol
ALJ	Stagnic Alisol
ALP	Plinthic Alisol
ALU	Humic Alisol
AN	Andosols
ANG	Gleyic Andosol
ANH	Haplic Andosol
ANH	Umblic Andosol
ANI	Gelic Andosol
ANM	Mollic Andosol
ANU	Umbric Andosol
ANZ	Vitric Andosol
AR	Arenosols
ARA	Albic Arenosol
ATA	Aric Anthrosol
ARB	Cambic Arenosol
ARC	Calcaric Arenosol
ARG	Gleyic Arenosol
ARH	Haplic Arenosol
ARK	Calcic Arenosol
ARL	Luvic Arenosol
ARO	Ferralic Arenosol
AT	Anthrosols
ATC	Cumulic Anthrosol
ATF	Fimic Anthrosol
ATU	Urbic Anthrosol
CH	Chernozems
CHG	Gleyic Chernozem
CHH	Haplic Chernozem
CHK	Calcic Chernozem
CHL	Luvic Chernozem
CHW	Glossic Chernozem
CL	Calcisols
CLH	Haplic Calcisol
CLL	Luvic Calcisol
CLP	Petric Calcisol
CM	Cambisol
CMC	Calcaric Cambisol
CMD	Dystric Cambisol
CME	Eutric Cambisol
CMG	Gleyic Cambisol
CMI	Gelic Cambisol
CMJ	Stagnic Cambisol
CMO	Ferralic Cambisol
CMU	Humic Cambisol
CMV	Vertic Cambisol
CMX	Chromic Cambisol
FL	Fluvisols
FLC	Calcaric Fluvisol
FLD	Dystric Fluvisol
FLE	Eutric Fluvisol
FLM	Mollic Fluvisol
FLS	Salic Fluvisol
FLT	Thionic Fluvisol
FLU	Umbric Fluvisol
FR	Ferralsols
FRG	Geric Ferralsol
FRH	Haplic Ferralsol
FRP	Plinthic Ferralsol
FRR	Rhodic Ferralsol
FRU	Humic Ferralsol
FRX	Xanthic Ferralsol
GL	Gleysols
GLA	Andic Gleysol
GLD	Dystric Gleysol
GLE	Eutric Gleysol
GLI	Gelic Gleysol
GLK	Calcic Gleysol
GLM	Mollic Gleysol
GLT	Thionic Gleysol
GLU	Umbric Gleysol
GRG	Gleyic Greysol
GRH	Haplic Greysol
GY	Gypsisols
GYH	Haplic Gypsisol
GYK	Calcic Gypsisol
GYL	Luvic Gypsisol
GYP	Petric Gypsisol
HS	Histosols
HSF	Fibric Histosol
HSI	Gelic Histosol

HSL Folic Histosol
HSS Terric Histosol
HST Thionic Histosol

KS Kastanozems
KSH Haplic Kastanozem
KSK Calcic Kastanozem
KSL Luvic Kastanozem
KSY Gypsic Kastanozem

LP Leptosols
LPC Calcaric Leptosol
LPD Dystric Leptosol
LPE Eutric Leptosol
LPI Gelic Leptosol
LPK Rendzic Leptosol
LPM Mollic Leptosol
LPQ Lithic Leptosol
LPU Umbric Leptosol

LV Luvisols
LVF Ferric Luvisol
LVG Gleyic Luvisol
LVH Haplic Luvisol
LVJ Stagnic Luvisol
LVK Calcic Luvisol
LVX Chromic Luvisol

LX Lixisols
LXA Albic Lixisol
LXF Ferric Lixisol
LXG Gleyic Lixisol
LXH Haplic Lixisol
LXJ Stagnic Lixisol
LXP Plinthic Lixisol

NT Nitisols
NTH Haplic Nitisols
NTR Rhodic Nitisols
NTU Humic Nitisols

PD Podzoluvisols
PDD Dystric Podzoluvisol
PDE Eutric Podzoluvisol
PDG Gleyic Podzoluvisol
PDI Gelic Podzoluvisol
PDJ Stagnic Podzoluvisol

PH Phaeozems
PHC Calcaric Pheaozem
PHG Gleyic Pheaozem

PHH Haplic Pheaozem

PHJ Stagnic Pheaozem
PHL Luvic Pheaozem

PL Planosols

PLD Dystric Planosol
PLE Eutric Planosol
PLI Gelic Planosol
PLM Mollic Planosol
PLU Umbric Planosol

PT Plinthosols
PTA Albic Plinthosol
PTD Dystric Plinthosol
PTE Eutric Plinthosol
PTU Humic Plinthosol

PZ Podzols
PZB Cambic Podzol
PZC Carbic Podzol
PZF Ferric Podzol
PZG Gleyic Podzol
PZH Haplic Podzol
PZI Gelic Podzol

RG Regosols
RGC Calcaric Regosol
RGD Dystric Regosol
RGE Eutric Regosol
RGI Gelic Regosol
RGU Umbric Regosol
RGY Gypsic Regosol

SC Solonchaks
SCG Gleyic Solonchak
SCH Haplic Solonchak
SCI Gelic Solonchak
SCK Calcic Solonchak
SCM Mollic Solonchak
SCN Sodic Solonchak
SCY Gypsic Solonchak

SN Solonetz
SNH Haplic Solonetz
SNJ Stagnic Solonetz
SNK Calcic Solonetz
SNM Mollic Solonetz
SNY Gypsic Solonetz

VR Vertisols
VRD Dystric Vertisol
VRH Haplic Vertisol
VRK Calcic Vertisol
VRY Gypsic Vertisol

TABLE II.4 CLASSIFICATION ACCORDING TO FAO/UNESCO SOIL CLASSIFICATION SYSTEM

Source: FAO, 1988

ATTRIBUTE: FAOSOIL2_C

AL	Albi	KA	Calci
AN	Andi	LU	Luvi
AR	Areni	MA	Mazi
CA	Calcari	MO	Molli
CH	Chromi	NI	Niti
CM	Cambi	OR	Orthi
DY	Dystri	PE	Pelli
EU	Eurti	RH	Rhodi
FE	Ferralo	SM	Sombri
FL	Fluvi	SO	Soli
GL	Gleyi	UM	Umbri
GU	Grumi	VE	Verti

TABLE II.5 CLASSIFICATION ACCORDING TO SOIL TAXONOMY

Source: Soil Survey Staff, 1987

ATTRIBUTE: SOILTAX_1

ABB	Paleboralf
ABE	Eutroboralf
ABF	Fragiboralf
ABG	Glossoboralf
ABN	Natriboralf
ABO	Cryoboralf
ADA	Hapludalf
ADB	Paleudalf
ADC	Agrudalf
ADF	Fragiudalf
ADG	Glossudalf
ADI	Ferrudalf
ADK	Kandiudalf
ADN	Natrudalf
ADR	Rhodudalf
AGF	Fraglossudalf
AQD	Duraqualf
AQF	Fragiaqualf
AQG	Grossaqualf
AQK	Kandiaqualf
AQL	Plinthaqualf
AQM	Umbraqualf
AQN	Natraqualf
AQO	Ochraqualf
AQW	Albaqualf
AUA	Haplustalf
AUB	Paleustalf
AUD	Durustalf
AUH	Kanhaplustalf
AUK	Kandiustalf
AUL	Plinthustalf
AUN	Natrustalf
AUR	Rhodustalf
AXA	Haploxeralf
AXB	Palexeralf
AXD	Durixeralf
AXF	Fragixeralf
AXL	Plinthoxeralf
AXN	Natrixeralf
AXR	Rhodoxeralf
DOB	Paleorthid
DOD	Durorthid
DOG	Gypsiorthid
DOK	Calciorthid
DOM	Camborthid
DOS	Salorthid
DRA	Haplargid
DRB	Paleargid
DRD	Durargid
DRJ	Nadurargid
DRN	Natrargid
EOC	Cryorthent
EOD	Udorthent
EOP	Torriorthent
EOT	Troporthent
EOU	Ustorhent
EOX	Xerorthent
EQA	Haplaquent
EQC	Cryaquent
EQI	Sulfaquent
EQS	Psammaquent
EQT	Tropaquent
EQV	Fluvaquent
EQW	Hydraquent
ER	Arent
ESC	Cryopsamment
ESD	Udipsamment
ESP	Torripsamment
EST	Tropopsamment
ESU	Ustipsamment
ESX	Xeropsamment
ESZ	Quartzipsamment
EVC	Cryofluvent
EVD	Udifluvent
EVP	Torrifluvent
EVT	Tropofluvent
EVU	Ustifluvent
EVX	Xerofluvent
HAC	Cryosaprist
HAM	Medisaprist
HAR	Borosaprist
HAT	Troposaprist
HEB	Borohemist
HEC	Cryohemist
HEI	Sulfihemist
HEL	Luvihemist
HEM	Medihemist
HEO	Sulfohemist
HET	Tropohemist
HIB	Borofibrist
HIC	Cryofibrist
HIL	Luvifibrist
HIM	Medifibrist
HIS	Sphagnofibrist
HIT	Tropofibrist
HLB	Borofolist
HLC	Cryofolist
HLT	Tropofolist
IG	Plaggept

IMA Haplumbrept
IMC Cryumbrept
IMF Fragiumbrept
IMX Xerumbrept
INC Cryandept
IND Durandept
INE Eutrandept
INP Placandept
INV Vitrandept
INW Hydrandept
INY Dystrandept
IOC Cryochrept
IOD Durochrept
IOE Eutrochrept
IOF Fragiochrept
IOU Ustochrept
IOX Xerochrept
IOY Dystrochrept
IQA Haplaquept
IQC Cryaquept
IQF Fragiaquept
IQH Humaquept
IQL Plinthaquept
IQN Andaquept
IQP Placaquept
IQS Sulfaquept
IQT Tropaquept
IQX Halaquept
ITE Eutropept
ITH Humitropept
ITS Sombritropept
ITU Ustropept
ITY Dystropept

MBA Haploboroll
MBB Paleboroll
MBC Cryoboroll
MBK Calciboroll
MBN Natriboroll
MBR Argiboroll
MBV Vermiboroll
MDA Hapludoll
MDB Paleudoll
MDR Argiudoll
MDV Vermudoll
MQA Haplaquoll
MQC Cryaquoll
MQD Duraquoll
MQK Calciaquoll
MQN Natraquoll
MQR Argiaquoll
MR Rendoll
MUA Haplustoll
MUB Paleustoll
MUD Durustoll
MUK Calciustoll
MUN Natrustoll
MUR Argiustoll
MUV Vermustoll
MWN Natralboll
MWR Argialboll
MXA Haploxeroll
MXD Durixeroll
MXK Calcixeroll
MXN Natrixeroll
MXP Palexeroll
MXR Argixeroll

ODA Hapludox
ODC Acrudox
ODE Eutrudox
ODK Kandiudox
ODS Sombriudox
OPA Haploperox
OPC Acroperox
OPE Eutroperox
OPK Kandiperox
OPS Sombriperox
OQA Haplaquox
OQC Acraquox
OQE Eutraquox
OQL Plinthaquox
OTA Haplotorrox
OTC Acritorrox
OTE Eutrotorrox
OUA Haplustox
OUC Acrustox
OUE Eutrustox
OUK Kandiustox
OUS Sombriustox

SHA Haplohumod
SHC Cryohumod
SHF Fragihumod
SHP Placohumod
SHT Tropohumod
SI Ferrod
SOA Haplorthod
SOC Cryorthod
SOF Fragiorthod
SOP Placorthod
SOT Troporthod
SQA Haplaquod
SQC Cryaquod
SQD Duraquod
SQF Fragiaquod
SQP Placaquod
SQS Sideraquod
SQT Tropaquod
UDA Hapludult
UDB Paleudult
UDF Fragiudult
UDL Plinthudult
UDR Rhodudult
UHA Haplohumult
UHB Palehumult

UHH	Kandihaplohumult
UHK	Kandihumult
UHL	Plinthohumult
UHS	Sombrihumult
UQB	Paleaquult
UQF	Fragiaquult
UQK	Kandiaquult
UQL	Plinthaquult
UQM	Umbraquult
UQO	Ochraquult
UQW	Albaquult
UUA	Haplustult
UUB	Paleustult
UUH	Kandihaplustult
UUK	Kandiustult
UUL	Plinthustult
UUR	Rhodustult
UXA	Haploxerult
UXB	Palexerult
VDL	Pelludert
VDR	Chromudert
VP	Torrert
VUL	Pellustert
VUR	Chromustert
VXL	Pelloxerert
VXR	Chromoxerert

TABLE II.6 CLASSIFICATION ACCORDING TO SOIL TAXONOMY

Source: Soil Survey Staff, 1987

ATTRIBUTE: SOILTAX2_C

AA	Typic
AB	Abruptic
AB04	Abruptic Aridic
AB08	Abruptic Cryic
AB10	Abruptic Haplic
AB14	Abruptic Udic
AB16	Abruptic Xerollic
AC	Acric
AC05	Acric Plinthic
AE	Aeric
AE03	Aeric Arenic
AE05	Aeric Grossarenic
AE06	Aeric Mollic
AE09	Aeric Tropic
AE10	Aeric Umbric
AE12	Aeric Xeric
AL	Albaquic
AL02	Albaquultic
AL04	Albic
AL08	Albic glossic
AL09	Albic Alfic
AL10	Albic
AL12	Albic Arenic
AL13	Albic Andeptic
AL16	Albic Lithic
AN	Andic
AN01	Andeptic
AN03	Andaquic
AN06	Andic Dystric
AN11	Andeptic Glos soboric
AN20	Andic Udic
AN22	Andic Ustic
AN24	Andaqueptic
AN25	Anionic
AN30	Anthropic
AQ	Aqualfic
AQ02	Aquentic
AQ04	Aqueptic
AQ06	Aquic
AQ08	Aquic Arenic
AQ14	Aquic Duric
AQ16	Aquic Durorthidic
AQ18	Aquic Dystric
AQ24	Aquic Haplic
AQ26	Aquic Lithic
AQ31	Aquic Psammentic
AQ34	Aquollic
AQ36	Aquultic
AR	Arenic
AR02	Arenic Aridic
AR04	Arenic Plinthaquic
AR06	Arenic Plinthic
AR07	Arenic Kandic
AR08	Arenic Rhodic
AR09	Arenic Kandic Rhodic
AR10	Arenic Ultic
AR11	Arenic Kanhaplic
AR12	Arenic Kanhaplic Rhodic
AR13	Arenic Petrocalcic
AR14	Arenic Umbric
AR15	Arenic Calciorthidic
AR16	Arenic Ustalfic
AR17	Arenic Ustochreptic
AR18	Arenic Ustollic
AR19	Arenic Petroferric
AR20	Arenic Petroferric Rhodic
AR21	Arenic Paleorthidic
AR22	Argiaquic
AR24	Argiaquic Xeric
AR26	Argic
AR28	Argic Lithic
AR30	Argic Pachic
AR32	Argic Vertic
AR34	Aridic
AR36	Aridic Calcic
AR42	Aridic Duric
AR50	Aridic Pachic
AR52	Aridic Petrocalcic
BO	Boralfic
BO02	Boralfic Lithic
BO04	Boralfic Udic
BO06	Borollic
BO08	Borollic Glossic
BO10	Borollic Lithic
BO12	Borollic Vertic
CA	Calcic
CA04	Calcic Pachic
CA06	Calciorthidic
CA10	Calcixerollic
CA20	Cambic
CH	Chromic
CH06	Chromudic
CR	Cryic
CR10	Cryic Lithic
CR14	Cryic Pachic
CU	Cumulic
CU02	Cumulic Udic
CU04	Cumulic Ultic
DU	Durargidic
DU02	Duric
DU08	Duroxerollic
DU10	Duroxerollic Lithic
DU11	Durochreptic
DU12	Durorthidic

DU14 Durorthidic Xeric
DY02 Dystric
DY03 Dystric Enthic
DY04 Dystric Fluventic
DY06 Dystric Lithic
DY08 Dystropeptic
EN Entic
EN02 Enthic Lithic
EN04 Eutropeptic
EN06 Enthic Ultic
EP Epiaquic
EP10 Epiaquic Orthoxic
EU Eutric
EU02 Eutrochreptic
EU04 Eutropeptic
FE Ferrudalfic
FI Fibric
FI02 Fibric Terric
FL02 Fluvaquentic
FL06 Fluventic
FL12 Fluventic Umbric
FR10 Flagiaquic
FR18 Fragic
GL02 Glossaquic
GL04 Glossic
GL10 Glossic Udic
GL12 Glossic Ustollic
GL14 Glossoboralfic
GL16 Glossoboric
GR Grossarenic
GR01 Grossarenic Entic
GR04 Grossarenic Plinthic
GR05 Grossarenic Petroferric
GR06 Grossarenic Petroferric Rhodic
GR07 Grossarenic Kandic
GR08 Grossarenic Kandic Rhodic
GR09 Grossarenic Kanhaplic
GR10 Grossarenic Kanhaplic Rhodic
GR11 Grossarenic Rhodic
GR12 Grossarenic Petrocalcic
GR13 Grossarenic Ustollic
GR14 Grossarenic Ustalfic
GR15 Grossarenic Aridic
HA Haplaquodic
HA01 Haplaquic
HA02 Haplic
HA05 Haplohumic
HA07 Haploxerollic
HA09 Hapludic
HA12 Hapludollic
HA16 Haplustollic
HE Hemic
HE02 Hemic Terric
HI Histic
HI02 Histic Lithic
HI06 Histic Pergelic
HU Humic
HU02 Humic Lithic
HU05 Humic Pergelic
HU06 Humoxic
HU10 Humaqueptic
HU15 Humic Rhodic
HU20 Humic Xanthic
HY Hydric
HY02 Hydric Lithic
IN Inceptic
KA Kandicic
KA02 Kandiudalfic
KA04 Kandiustalfic
KH Kanhaplic
LE Leptic
LI Limnic
LI02 Lithic
LI03 Lithic Petrocalcic
LI04 Lithic Mollic
LI05 Lithic Pergelic
LI06 Lithic Ruptic Alfic
LI07 Lithic Ruptic Argic
LI08 Lithic Ruptic Entic Xerollic
LI09 Lithic Ruptic Entic
LI10 Lithic Udic
LI11 Lithic Ruptic Xerorthentic
LI12 Lithic Ultic
LI13 Lithic Ruptic Ultic
LI14 Lithic Umbric
LI15 Lithic Ruptic-Xerochreptic
LI16 Lithic Ustic
LI18 Lithic Ustollic
LI20 Lithic Vertic
LI22 Lithic Xeric
LI24 Lithic Xerollic
MO Mollic
NA06 Natric
OC Ochreptic
OR Orthidic
OR01 Orthic
OR02 Orthoxic
PA Pachic
PA02 Pachic Udic
PA04 Pachic Ultic
PA06 Paleorthidic
PA08 Paleustollic
PA10 Palexerollic
PA20 Paralithic Vertic
PE Pergelic
PE01 Pergelic Ruptic Histic
PE02 Pergelic Sideric
PE04 Petrocalcic
PE06 Petrocalcic Ustalfic
PE08 Petrocalcic Ustollic
PE14 Petrocalcic Xerollic
PE16 Petroferric
PE17 Petroferric Rhodic
PE20 Petrogypsic

PK Placic
PK10 Plaggeptic
PK12 Plaggic
PL Plinthaquic
PL04 Plinthic
PL06 Plinthudic
PS Psammaquentic
PS02 Psammentic
PS04 Psammentic Kandic
PS06 Psammentic Rhodic
PS08 Psammentic Kandic Rhodic
PS09 Psammentic Ustollic
PS10 Psammentic Ustalfic
QU Quartzipsammentic
RE Rendollic
RH Rhodic
RU02 Ruptic-Alfic
RU09 Ruptic-Lithic
RU11 Ruptic-Lithic-Entic
RU15 Ruptic-Lithic-Xerochreptic
RU17 Ruptic-Ultic
RU19 Ruptic-Vertic
SA Salorthidic
SA02 Sapric
SA04 Sapric Terric
SI Sidfric
SO Sombric
SO04 Sombrihumic
SP Sphagnic
SP02 Sphagnic Terric
SP04 Spodic
SU Sulfic
TE Terric
TH04 Thapto-Histic
TH06 Thapto-Histic Tropic
TO Torrertic
TO02 Torrifluventic
TO04 Torriorthentic
TO06 Torripsammentic
TO10 Torroxic
TR Tropaquodic
TR02 Tropeptic
TR04 Tropic
UD Udertic
UD01 Udalfic
UD02 Udic
UD03 Udollic
UD05 Udorthentic
UD10 Udoxic
UL Ultic
UM Umbreptic
UM02 Umbric
US Ustalfic
US02 Usteric
US04 Ustic
US06 Ustochreptic
US08 Ustollic
US12 Ustoxic
VE Vermic
VE02 Vertic
XA Xanthic
XE Xeralfic
XE03 Xerertic
XE04 Xeric
XE08 Xerollic

TABLE II.7 CLASSIFICATION ACCORDING TO SOIL TAXONOMY

Source: Soil Survey Staff, 1987

ATTRIBUTE: SOILTAX3_C

03	allitic	27	illitic (calcareous)
05	carbonatic	28	kaolinitic
08	coprogenous	30	marly
09	chloritic	32	micaceous
10	diatomaceous	34	mixed
12	ferrihumic	35	mixed (calcareous)
14	ferritic	37	montmorrilonitic
16	ferruginous	38	montmorrilonitic (calcareous)
18	gibbsitic	40	oxidic
20	glauconitic	44	serpentinitic
22	gypsic	46	siliceous
24	halloysitic	48	sesquic
26	illitic	50	vermiculitic

annex II-22

ANNEX III

EXAMPLE OF A TROFOLIN DATA REPORT (MSP_LAY)

Record nr: 1

AREA_ID	BIPINDI
OBS_NR	56
LAYER_NR	4
HORIZMSP_C	Bw2 ()
BOUND_UL	55.0
BOUND_LL	90.0
BOUNDW_C	D (Diffuse)
BOUNDTOP_C	S (Smooth)
HUEDRY_C	10YR ()
VALDRY_C	5 ()
CHRDRY_C	6 ()
HUEMOIST_C	10YR ()
VALMOIST_C	6 ()
CHRMOIST_C	8 ()
MOTTABUND	-1
MOTTSIZ_C	
MOTTCON_C	
MOTTSHA_C	
MOTTHUE_C	
MOTTVAL_C	
MOTTCHR_C	
F0_2_C	SACL (Sandy clay loam)
F2_75_C	SG (Slightly gravelly)
F75_250_C	NS (No stones)
F250_C	NB (No boulders)
CONSDRY_C	SH (Slightly hard)
CONSMOI_C	FR (Friable)
STICKY_C	S (Sticky)
PLASTIC_C	P (Plastic)
SMEARY_C	SS (Strongly smeary)
STRUCGR1_C	MC (Structureless - moderately coherent)
STRUCSI1_C	
STRUCTY1_C	PM (Porous massive)
STRUCGR2_C	
STRUCSI2_C	
STRUCTY2_C	
STRUCREL_C	
CUTQUAN1_C	P (Patchy)
CUTTHIC1_C	F (Thin (faint))
CUTKIND1_C	F (Iron oxide)
CUTLOC1_C	VO (In voids (pores))
CUTQUAN2_C	
CUTTHIC2_C	
CUTKIND2_C	
CUTLOC2_C	
PORESIZ1_C	F (Fine)
POREABU1_C	C (Common)
PORESIZ2_C	V (Very fine)
POREABU2_C	M (Many)
POROSITY	HIGHLY POROUS, VERY RAPID ABSORPTION OF WATER
ROOTSIZ1_C	C (Coarse)
ROOTABU1_C	F (Few)
ROOTORI1_C	O (Oblique)
ROOTSIZ2_C	V (Very fine)
ROOTABU2_C	C (Common)

annex III-2

ROOTORI2_C	R (Random)
ROOTFINE	-1
ROOTCOARS	-1
ROCKSIZ1_C	F (Fine gravel)
ROCKABU1_C	F (Few)
ROCKWEA1_C	F (Fresh)
ROCKNAT1_C	MQ (Quartzite)
ROCKSIZ2_C	
ROCKABU2_C	
ROCKWEA2_C	
ROCKNAT2_C	
CONCQUA1_C	N (None)
CONCSIZ1_C	
CONCHAR1_C	
CONCSHA1_C	
CONCNAT1_C	
CONCQUA2_C	
CONCSIZ2_C	
CONCHAR2_C	
CONCSHA2_C	
CONCNAT2_C	
CARBOCON_C	N (Non calcareous)
CARBOLOC_C	
PH_H2O	5.6
PH_KCL	-1.0
EC	0.120
SAMP_L	Y

ANNEX IV

EXAMPLES OF PROGRAMMING REPORTS IN DBASE

EXAMPLE 1: CLIMATE

1.a Programme

```
   procedure cli
*
* This program generates the report for climatic data.
*
* Start initializing
*
   set talk off
   set escape off
   public last_station
   last_station = "NULL"
   _padvance = "FORMFEED"
   on page

   okee = .f.
   store getenv("trofodata") to trof_dir
   climstat = trof_dir + "\climstat"
   use (climstat)
   if file("repcli01.ndx")
      ERASE repcli01.ndx
   endif
   index on station_c+climdata_c to repcli01
   set index to repcli01
   accept "Enter name of area to create report for : " to user_area
   if len(user_area) = 0
      return
   endif
   user_area = upper(user_area)
*
   locate for AREA_ID = USER_AREA
   set console off
   set printer on
   do while found()
      do print_record with jan,feb,mar,apr,may,jun,jul;
            ,aug,sep,oct,nov,dec,climdata_c,station_c,beginperio,endperiod;
            ,xcoor,ycoor,AREA_ID
      continue
   enddo
   ? " "
   ? " "
   ? "P - precipitation                    PET - potential evapotranspiration" at 2
   ? "T - temperature                      Tmax - maximum day temperature " at 2
   ? "Tmin - minimum day temperature       Hum - relative air humidity" at 2
   ? "I - hours of sunshine" at 2
   set printer off
```

annex IV-2

```
set console on
clear
return

procedure print_record
parameters jan,feb,mar,apr,may,jun,jul,aug,sep,oct,nov,dec, ;
          climdata_c,station_c,beginperio,endperiod,xcoor,ycoor,area_id
if station_c <> last_station
   do page_header with station_c,xcoor,ycoor,AREA_ID
   last_station = station_c
endif
? climdata_c       at 2 ;
   ,jan              at 7 picture "999" ;
   ,feb              at 12 picture "999" ;
   ,mar              at 17 picture "999" ;
   ,apr              at 22 picture "999" ;
   ,may              at 27 picture "999" ;
   ,jun              at 32 picture "999" ;
   ,jul              at 37 picture "999" ;
   ,aug              at 42 picture "999" ;
   ,sep              at 47 picture "999" ;
   ,oct              at 52 picture "999" ;
   ,nov              at 57 picture "999" ;
   ,dec              at 62 picture "999" ;
   ,mod(beginperio,100)       at 67 picture "99"  ;
   ,"/" at 70 ;
   ,mod(endperiod,100)        at 71 picture "99"
return

procedure page_header
parameters station_c,xcoor,ycoor,area_id
? " " at 2
? " " at 2
? " " at 2
? "Station :" at 1 ;
 , station_c at 10 ;
 , ";" at 20 ;
 , xcoor at 22  ;
 , ";" at 34 ;
 , ycoor at 36  ;
 , "AREA-ID : " AT 60 , AREA_ID
? " "
? "  Type  Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Per"
return
```

1.b Report Output

Station :B ; 04.35. N ; 14.24. E AREA-ID : BIPINDI

Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Per
HUM	77	73	72	75	80	81	84	83	81	81	79	78	55 /75
I	161	165	156	174	192	139	105	94	112	138	178	183	52 /77
P	31	50	119	153	184	173	112	161	217	274	117	34	51 /76
PET	95	92	117	119	111	96	89	91	94	99	98	92	55 /75
T	23	24	25	25	24	23	22	23	23	24	24	23	55 /75
TMAX	30	31	31	31	30	29	27	27	29	29	29	30	55 /75
TMIN	17	18	20	20	19	19	19	19	19	19	18	17	55 /75

P - precipitation
T - temperature
Tmin - minimum day temperature
I - hours of sunshine
PET - potential evapotranspiration
Tmax - maximum day temperature
Hum - relative air humidity

EXAMPLE 2: VEGETATION

2.a Programme

```
set talk off
store "formfeed" to _padvance
use in 1
use in 2
close databases
close indexes

store getenv("TROFOdata") + "\veg_stru" to veg_stru
store getenv("TROFOdata") + "\veg_rele" to veg_rele
store getenv("TROFOdata") + "\veg_spec" to veg_spec

accept "Enter area name to create report for : " to user_area
if len(user_area) = 0
   return
endif
user_area = upper(user_area)

select 1
use (veg_stru)
set filter to area_id = user_area
set fields to obs_nr,layer_nr,height_av,;
              cover,abund1_c,grform1_c,abund2_c,grform2_c,abund3_c,;
              grform3_c,abund4_c,grform4_c,abund5_c,grform5_c
go 1
if file ("v1a.dbf")
   erase "v1a.dbf"
endif
if file ("v1b.dbf")
   erase v1b.dbf
endif
copy to v1a
use v1a
if reccount() > 1
   sort to v1b on obs_nr
else
   copy to v1b
endif
use v1b
erase v1a.dbf
if file ("v1b.ndx")
   erase v1b.ndx"
endif
index on obs_nr to v1b
close databases
```

annex IV-6

```
select 2
use (veg_rele)
set filter to area_id = user_area
set fields to obs_nr,surveyor_c,surv_bot_c,unesveg1_c,unesveg2_c,unesveg3_c,;
              unesveg4_c,unesveg5_c,unesveg6_c,date
if file("v2a.dbf")
   erase v2a.dbf
endif
if file("v2b.dbf")
   erase v2b.dbf
endif
GO 1
copy to v2a
use v2a
if reccount() > 1
  sort on obs_nr to v2b
else
  copy to v2b
endif
use v2b
if file("v2b.ndx")
   erase v2b.ndx
endif
erase v2a.dbf
if file("v2b.ndx")
   erase v2b.ndx
endif
index on obs_nr to v2b
close databases

select 1
close databases
use v1b
use v2b in 2
if file ("v3.dbf")
   erase v3.dbf
endif
if file("v3b.dbf")
   erase v3b.dbf
endif
join with B to v3 for a->obs_nr = b->obs_nr
if file ("v3b.dbf")
   erase v3b.dbf
endif
use v3
if reccount() > 1
   sort on obs_nr to v3b
else
```

```
   copy to v3b
endif
close databases
use v3b
erase v3
erase v1b
erase v2b

*
* Start of main report
*
   SET PRINT ON
   last_page = _pageno
   n_rec_stru = reccount()
   rec_stru = 1
   last_obs_nr = -1
   do while rec_stru <=  n_rec_stru
      go rec_stru
      if last_obs_nr <> obs_nr
         store unesveg1_c + unesveg2_c + unesveg3_c + unesveg4_c + ;
               unesveg5_c + unesveg6_c to unesco
         do rel_header with surveyor_c,surv_bot_c,unesco,date,obs_nr
         do layer_header
         last_obs_nr = obs_nr
      endif
      do while rec_stru <= n_rec_stru .and. last_obs_nr = obs_nr
         do layer with layer_nr , height_av,cover,abund1_c,grform1_c, ;
              abund2_c,grform2_c,abund3_c,grform3_c,abund4_c,grform4_c,;
              abund5_c,grform5_c
         rec_stru = rec_stru + 1
         if rec_stru <= n_rec_stru
            goto rec_stru
         endif
      enddo
   ? "-----------------------------------------------------------------"
      do species with last_obs_nr
      select 1
   enddo
   set print off
   close databases

   procedure rel_header
   parameters surveyor,surv_bot_c,unesco,date,obs_nr
   ? " "
   ? " "
   ? "VEGETATION RELEVEE FOR OBS_SITE  : " AT 1 , ;
     OBS_NR AT 36 PICTURE "99"   , ;
     "AREA : " AT 40 , USER_AREA AT 47
```

annex IV-8

```
? "AUTHOR   :" at 1, SURVEYOR   at 12
? "BOTANIST :" at 1, SURV_BOT_C at 12
? "DATE     :" at 1, DATE       at 12
? " "
? " "
return

procedure layer_header
? " "
? "                                1ST GF   2ND GF   3RD GF   4TH GF   5TH GF"
? "LAYER HEIGHT COVER  TY AB    TY AB    TY AB    TY AB    TY AB"
? "-------------------------------------------------------------------"
return

procedure layer
parameters layer_nr , height_av,cover,abund1_c,grform1_c, ;
         abund2_c,grform2_c,abund3_c,grform3_c,abund4_c,grform4_c,;
         abund5_c,grform5_c
? Layer_nr        at 1    picture "99"    , ;
  height_av       at 5    picture "999.9" , ;
  cover           at 13   picture "999"   , ;
  abund1_c        at 23   picture "99"    , ;
  grform1_c       at 20   picture "99"    , ;
  abund2_c        at 33   picture "99"    , ;
  grform2_c       at 30   picture "99"    , ;
  abund3_c        at 43   picture "99"    , ;
  grform3_c       at 40   picture "99"    , ;
  abund4_c        at 53   picture "99"    , ;
  grform4_c       at 50   picture "99"    , ;
  abund5_c        at 63   picture "99"    , ;
  grform5_c       at 60   picture "99"
return

procedure species
parameter l_obs_nr
select 2
use (veg_spec)
set filter to obs_nr = l_obs_nr .and. area_id = user_area
go 1
if file("s1a.dbf")
   erase s1a.dbf
endif
if file("s1a.dbf")
   erase s1a.dbf
endif
copy to s1a.dbf
if file("s1b.dbf")
   erase s1b.dbf
```

```
endif
set filter to
use s1a.dbf
if reccount() > 1
   sort on layer_nr to s1b.dbf
else
   copy to s1b.dbf
endif
use s1b.dbf
erase s1a.dbf
? " "
? " "
? "LATNAME    LOCNAME   FIELDNAME      LAY AB HEIGHT R D A V"
? "-------------------------------------------------------"
n_spec = reccount()
spec_nr = 1
do while spec_nr <= n_spec
   go spec_nr
   if last_page <> _pageno
   eject
   ? " "
   ? " "
   ? "LATNAME    LOCNAME   FIELDNAME      LAY AB HEIGHT R D A V"
   ? "-------------------------------------------------------"
   last_page = _pageno
   endif
   ? latname at  1 , ;
     locname at 11 , ;
     fieldname at 21 , ;
     layer_nr at 36 picture "99" , ;
     abund_c at 40 picture "99" , ;
     height at 43 picture "999.9" , ;
     reprod_c at  50 , ;
     decidu_c at 52  , ;
     age_c at 54 ,;
     vital_c at 56
   spec_nr = spec_nr + 1
enddo
? "-------------------------------------------------------"
use in 2
erase s1b.dbf
return
```

annex IV-10

2.b Report Output

VEGETATION RELEVEE FOR OBS_SITE : 15 AREA : UJUNG
AUTHOR : HOMMEL
BOTANIST : INDRA
DATE : 20-10-88

LAYER	HEIGHT	COVER	1ST GF TY	AB	2ND GF TY	AB	3RD GF TY	AB	4TH GF TY	AB	5TH GF TY	AB
1	35,0	30	ET	3								
2	20,0	85	ET	6	TP	1	PL	1				
3	6,0	2	BS	2	SP	2	RS	1	CF	1		1
4	1,0	20	BH	2	GH	1						

LATNAME	LOCNAME	FIELDNAME	LAY	AB	HEIGHT	R	D	A	V
NEESALTI	BENGANG		1	3	40,0	B	L	M	H
ANTIVELU	KISEUHEU		2	F	25,0	V	L	M	H
DIPTTRIN	-		2	2	25,0	F	L	M	H
LESASAMB	SULANGKA		2	F	15,0	V	L	M	H
CALAORNA	ROTAN SE		2	F	15,0	V	L	M	H
STERCOCC	HANAPBUU		2	F	10,0	V	L	M	H
NEONCALY	CANGCARA		2	F	15,0	V	L	M	H
PIPER SP	KARU		2	F	20,0	B	L	M	H
CINNSINT	KITEJA		2	F	15,0	X	L	M	H
DRYPRHAC	KIBOLEND		2	F	20,0	V	L	M	H
MELINITI	KIGONYOR		2	F	15,0	V	L	M	H
EURYACUM	KUHKURAN		2	F	25,0	V	L	M	H
CISSDIFF	AR.KROKO		2	F	15,0	V	L	M	H
GARCROST	KIMENYAN		2	F	20,0	V	L	M	H
MANGODOR	MANGGA G		2	F	20,0	F	L	M	H
CYATJUNG	PAKUHAJI		2	M	25,0	V	L	M	H
ARENOBTU	LANGKAP		2	F	20,0	V	L	M	H
DRYPLONG	KITULANG		2	F	15,0	V	L	M	H
DIOSFRUT	KISIRI		2	1	25,0	B	L	M	H
IXORGRAN	-	-	3	2	6,0	V	L	M	H
FREYSPEC	AR.HARAS		3	F	8,0	V	L	M	H
LASIHIRS	JALATONG		3	F	3,0	V	L	M	H
XANTFRUT	REUREUND		3	F	5,0	V	L	M	H
LASIRETI	KIREGAS		3	F	4,0	V	L	M	H
PLEOSPEC	HANJUANG		3	F	5,0	V	L	M	H
CALAJAVE	ROTANCAC		3	1	6,0	V	L	M	H
PANDNITI	HARASHAS		3	F	4,0	V	L	M	H
LABIPUMI	BABAKOAN		3	F	6,0	V	L	M	H
LICUGRAC	SADANGGU		3	1	6,0	F	L	M	H
PHYLHASS	KINERENG	-	3	M	2,0	V	L	M	H
STENPALU	PAKUHURA		3	F	4,0	V	L	M	H
AMORVARI	ACUNG		4	F	0,7	V	L	M	H
TECTVAST	KADAKA		4	F	0,5	V	L	M	H

LATNAME	LOCNAME	FIELDNAME	LAY	AB	HEIGHT	R	D	A	V
SCHICALO	SENTE		4	F	2,0	X	L	M	A
CYRTPICT	R.KROKOT		4	M	0,5	B	L	M	H
APAMTOME	KUTAK		4	F	1,2	V	L	M	H
SELAG SP	PAKURANE		4	F	0,5	V	L	M	H
HOMACORD	CARIANG		4	F	0,4	V	L	M	H
PHRYPUBI	PATAT		4	F	0,3	X	L	M	H
AMOMACUL	PARAHULU		4	F	1,5	B	L	M	H

EXAMPLE 3: LAND MAPPING UNITS - OBSERVATION SITES

3.a Programme

```
    set talk off
    close databases
*
* Display for each Land Mapping Unit all the observation sites
*
    store getenv("trofodata") to trofdir
    if len(trofdir) = 0
      ? " "
      ? "Environment variable TROFODATA not set"
      ? " "
      quit
    endif
*
* Ask the user which area is to be used
*
    accept "Enter area-id to create report for : " to user_area
    if len(user_area) = 0
      return
    endif
    user_area = upper(user_area)
*
* Define variables for the files to use
*
    store trofdir + "\land_map" to land_map
    store trofdir + "\obs_site" to obs_site


    do killfile with "l1a.dbf"
    do killfile with "l1b.dbf"

    use (land_map)
    use (obs_site) in 2
    set filter to a->area_id = user_area
    join with B to l1a.dbf for a->area_id = b->area_id .and. ;
                               a->lmu_nr = b->lmu_nr
    use l1a
    if reccount() > 1
      sort to l1b on lmu_nr,obs_nr
    else
      copy to l1b
    endif
    close databases
    erase l1a.dbf
    use l1b
```

```
*
* Start of main program
*
    n_rec = reccount()
    if n_rec = 0
      ? "No records found"
      quit
    endif
    rec_nr = 1
    go 1
    last_lmu = lmu_nr
    set print on
    do while rec_nr < n_rec
       do print_lmu with
last_lmu,area,CLIMZON1_c,CLIMZON2_c,CLIMZON3_c,photosy1_c,;
            photosy2_c,landform_c,relief_c,eleva_ll,eleva_ul
       last_lmu = lmu_nr
       do while rec_nr <= n_rec .and. last_lmu = lmu_nr
          do obs with obs_nr,xcoor,ycoor,;
             siteatt_l,vegrel_l,l_use_l,hp_pit_l,msp_pit_l,;
              auger_l
          rec_nr = rec_nr + 1
          if rec_nr <= n_rec
             go rec_nr
          endif
       enddo
       ? "--------------------------------------------------------------------------------"
    enddo
    set print off
    return          && end of main program

    procedure killfile
    parameters filename
    if file (filename)
      erase (filename)
    endif
    return

    procedure print_lmu
    parameters lmu,area,CLIMZON1_c,CLIMZON2_c,CLIMZON3_c,photosy1_c,;
            photosy2_c,landform_c,relief_c,eleva_ll,eleva_ul
    ? " "
    ? " "
    ? " "
    ? "LAND MAPPING UNIT : " , LMU PICTURE "99"," AREA_ID : ",user_area
    ? "-----------------------------------------"
    ? " "
    ? "Photosymbol   : ",PHOTOSY1_C,"/",PHOTOSY2_C
```

```
? "Climatic zone : ",CLIMZON1_C,CLIMZON2_C,CLIMZON3_C
? "Landform      : ",LANDFORM_C
? "Relief        : ",RELIEF_C
? "Elevation     : ",ELEVA_LL," - ",ELEVA_UL
? " "
? " "
? " "
? "Observation site information"
? " "
? "Obs  X-coor    Y-coor    Site.Att  Veg.Rel  Land-use  Humus  Mineral  Auger"
? "-------------------------------------------------------------------------------"
RETURN

procedure obs
parameters obs_nr,xcoor,ycoor,siteatt_l,vegrel_l,l_use_l,hp_pit_l,msp_pit_l,;
          auger_l
? obs_nr picture "99" ;
, xcoor at 5 ;
, ycoor at 16 ;
, iif(SITEATT_L,"Yes","No") at 27 ;
, iif(VEGREL_L,"Yes","No")  at 37 ;
, iif(L_USE_L,"Yes","No") at 47 ;
, iif(HP_PIT_L,"Yes","No") at 57 ;
, iif(MSP_PIT_L,"Yes","No") at 64;
, iif(AUGER_L,"Yes","No")   at 73
return
```

annex IV-16

3.b Report Output

LAND MAPPING UNIT : 10 AREA_ID : BIPINDI

Photosymbol : 1GU3 / F23v
Climatic zone : FR
Landform : LU
Relief : R
Elevation : 480 - 660

Observation site information

Obs	X-coor	Y-coor	Site.Att	Veg.Rel	Land-use	Humus	Mineral	Auger
5	10.45.56 E	02.59.10 N	Yes	No	No	Yes	Yes	No
6	10.46.10 E	03.01.01 N	Yes	Yes	No	Yes	No	Yes
7	10.46.25 E	03.01.55 N	Yes	Yes	Yes	Yes	No	Yes
10	10.52.33 E	03.02.41 N	Yes	No	Yes	Yes	No	Yes
11	10.49.21 E	03.02.19 N	Yes	Yes	Yes	Yes	Yes	No
18	10.48.12 E	02.56.54 N	Yes	Yes	No	Yes	No	Yes
19	10.48.44 E	02.56.02 N	Yes	Yes	No	No	No	Yes
56	10.47.39 E	02.58.15 N	Yes	Yes	Yes	Yes	Yes	No
57	10.46.51 E	02.58.44 N	Yes	No	Yes	Yes	No	Yes
59	10.49.12 E	02.57.59 N	Yes	Yes	No	Yes	Yes	No