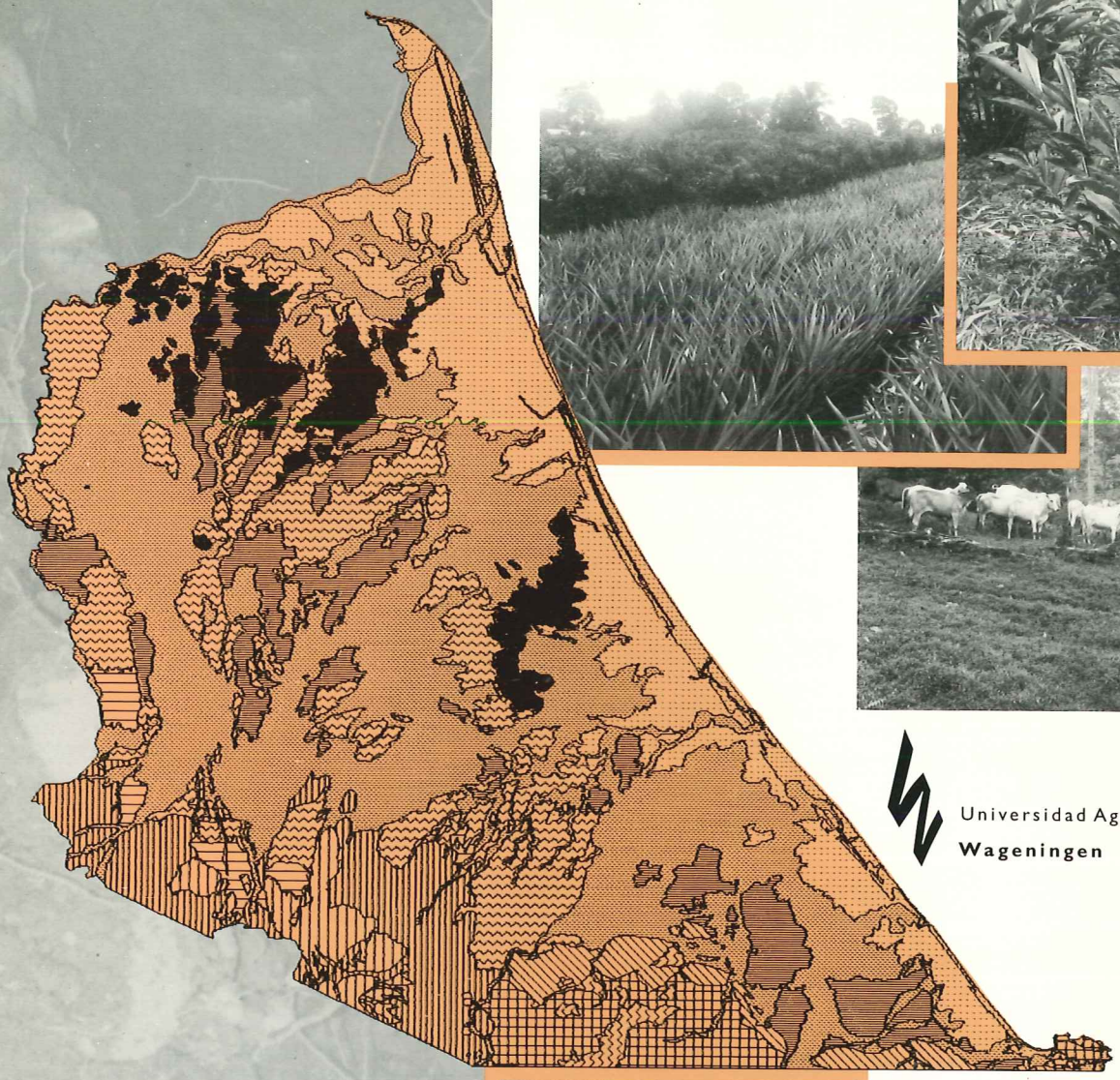
THE SIESTA GEOGRAPHIC DATABASE
INSTRUCTION FOR ITS USE
AND MAINTENANCE



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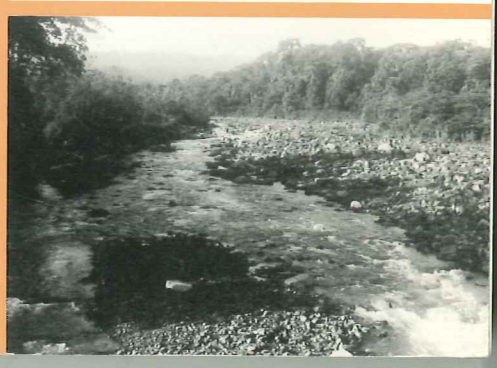

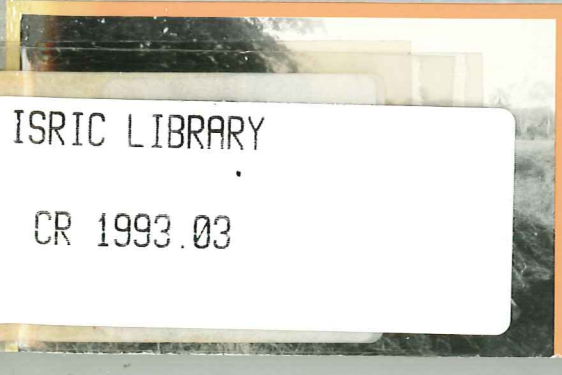

ATLANTIC ZONE PROGRAMME

Phase 2

Report No. 22b

THE SIESTA GEOGRAPHIC DATABASE

INSTRUCTION FOR ITS USE AND MAINTENANCE

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CENTRO AGRONOMICO TROPICAL DE
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PREFACE

The Geographic Database SIESTA is developed during the period 1987 - 1992. The major part of the work was carried out by Piet Oosterom and Willem Wielemaker concerning first the data acquisition and later the development of the database. John Stuiver assisted with respect to the geometric aspects of SIESTA.

In 1991 and 1992 I was involved in the phase of data capture and map compilation as well as the writing of various query procedures within ARC/INFO. Thanks to the stimulating ideas of Piet Oosterom various system applications were developed by me, as for instance the dynamic structuring of legends; unfortunately he wasn't able to execute this work himself because he was not able to continue his work in Wageningen.

I am indebted to Roland van Zoest and Philip Wenting, both working at CGI (Centre for Geographical Information processing) who were very helpful in solving technical problems.

I am grateful to prof. J. Bouma for support and encouragement.

A special word of thanks goes to Willem Wielemaker for his advice when preparing this report and for the time he spent in reading and correcting the document.

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1 INTRODUCTION

This paper is meant to be a guideline for the use and maintenance of the SIESTA geographic database. It is assumed that users of this 'manual' are acquainted with ARC/INFO. They should also be familiar with the principles of SIESTA as presented in Wielemaker and Vogel (eds.), 1993 (A soil and land information system (SIESTA) for the North eastern Atlantic Zone of Costa Rica).
In the following chapters an outline is given of the potentialities of the SIESTA database in the ARC/INFO environment. More detailed instruction on data presentation and database manipulation can be derived from various programs that are enumerated in annex 6 and 7 (a listing of some of these programs is given in annex 9).

2 THE SENSE OF SIESTA

SIESTA is an abbreviation of: Sistema de Información para la Evaluación de Suelos y Tierras de la Zona Atlantica de Costa Rica, which means that it is a soil and land information system for the Atlantic Zone of Costa Rica.
The system is developed to be a practical tool in soil and land surveys. When a survey is initiated, little may be known about the data that have to be recorded. During the survey, when the information is accruing, a deeper understanding of the landscape, gives a better view on the kind of information that has to be stored. Along with the increase in knowledge of the existing relations and structures within a certain area, the capacity of the information storage system that describes these aspects should develop. So a flexible approach to data storage and presentation is needed. In the early stages of the survey, terrain structures and soiltypes which are distinguished in a pilot area can be described and stored in datafiles as typical terrain units. During the survey, new terrain components and soils are discovered which gives rise to the definition of new terrain units. The design of the information system must be such that new information can be added easily while at the same time the performance of the system remains independent of the amount of data it stores.
SIESTA complies with these requisites. It is based on the interpretation of aerial photographs combined with a field survey. Digitizing of photos and coordinate conversions as well as database development were executed on PC. The compilation of the map and the linking of databases were carried out in ARC/INFO environment on a MICRO/VAX (see Oosterom 1992).
Within ARC/INFO several databases can be linked to the geometric data, i.e. the coverage. A coverage can contain polygons, these map features are thematically described by specific soil and land properties. Each polygon has a label point. The label point is used to assign the polygon a USER-ID. In SIESTA this USER-ID is called a Mapping Unit Identifier (MU-ID).
A Mapping Unit is described by a specific combination of Terrain Units. A Mapping Unit contains at least one, and at most five Terrain Units. The file STMU.DBF contains the mapping unit composition. A Terrain Unit (TU) is the smallest survey division, it is described in the database but is not indicated on the map. The attributes which describe the Terrain Unit are named Terrain Properties (see table 2.1). A TU is defined by a unique combination of attribute values which are recorded in the datafile TU.DBF. The attribute soil is described in terms of soil properties in a separate datafile, the SU.DBF.

TABLE 2.1 Description of Terrain Properties (file TP.DBF)

TERRAIN PROPERTY	DESCRIPTION ENGLISH	DESCRIPTION SPANISH
TP1	PHYSIOGRAPHY	FISIOGRAFIA
TP2	GEOLOGY	GEOLOGIA
TP3	MAJOR LANDFORM	FORMA DE TERRENO MAYOR
TP4	MINOR LANDFORM	FORMA DE TERRENO MINOR
TP5	PARENT MATERIAL	MATERIAL DE PARTIDA
TP6	SLOPE GRADIENT	GRADO DE PENDIENTE
TP7	SUBSTRATUM	SUBSTRATO
TP8	SUBSURFACE STONINESS	PEDREGOSIDAD DENTRO DEL PERFIL
TP9	SURFACE STONINESS	PEDREGOSIDAD EN LA SUPERFICIE
TP10	SOIL	SUELO

The distinguished soil properties are indicated in table 2.2. The relate structure between the tables is shown in figure 2.1. In this figure another file appears, the LE.DBF. This file contains landevaluation data (derived from interpretation of data in the former three tables), minor changes in the former mentioned datafiles may cause that major adjustments of data values of this file are necessary. A listing of these files can be found in annex 5. Information of topography is also available within SIESTA. The topography is derived from an aerial photograph interpretation and stored in a separate map. The topographic situation is liable to changes and the topographic map is not yet verified by means of a ground survey, so differences between the map and the actual situation may be present. Table 2.3 displays the kind of topography that is distinguished.

TABLE 2.2 Description of Soil Properties (file SP.DBF)

SOIL PROPERTY	DESCRIPTION ENGLISH	DESCRIPTION SPANISH
SP1	ANDIC PROPERTIES	PROPIEDADES ANDICAS
SP2	HYDRIC PROPERTIES	PROPIEDADES HIDRICAS
SP3	HISTIC PROPERTIES	PROPIEDADES HISTICAS
SP4	N-VALUE	MADUREZ
SP5	A-HORIZON	HORIZONTE-A
SP6	EFFECTIVE SOIL DEPTH	PROFUNDIDAD EFECTIVA DEL SUELO
SP7	TEXTURE	TEXTURA
SP8	CATION EXCHANGE CAPACITY (CEC)	CAP. DE INTERC. DE CAT. (CIC)
SP9	REACTION CLASS	CLASE DE REACCION
SP10	BASE SATURATION (25-100CM)	SATURACION DE BASES (25-200CM)
SP11	DRAINAGE CLASS	CLASE DE DRENAJE
SP12	ACIDITY CLASS	CLASE DE ACIDEZ
SP13	SOIL DEVELOPMENT STAGE	FASE DE DESARROLLO DEL SUELO

TABLE 2.3 Distinguished topography (file TOPO.DBF)

TOPO-ID	DESCRIPTION ENGLISH	DESCRIPTION SPANISH
1	MAIN RIVER	RIO PRINCIPAL
2	INTERMEDIATE RIVER	RIO INTERMEDIO
3	MINOR RIVER	RIO MENOR
4	RIVELET	RIACHUELO
5	GULLY	ARROYO
7	CANAL	CANAL
9	LAGUNA	LAGUNA
11	NATIONAL ROAD (TARMAC)	CAMINO NACIONAL PAVIMENTADO
12	NATIONAL ROAD (GRAVEL)	CAMINO NACIONAL DE GRAVA
13	REGIONAL ROAD (TARMAC)	CAMINO REGIONAL PAVIMENTADO
14	REGIONAL ROAD (GRAVEL)	CAMINO REGIONAL DE GRAVA
15	LOCAL ROAD (TARMAC)	CAMINO LOCAL PAVIMENTADO
16	LOCAL ROAD (GRAVEL)	CAMINO LOCAL DE GRAVA
17	LOCAL ROAD (UNSURFACED)	CAMINO DE TIERRA
18	FARM ROAD	CAMINO RURAL
19	TRACK	SENDERO
20	VILLAGE OR TOWN ROAD	CAMINO POBLACIONAL
21	RAILWAY	FERROCARRIL

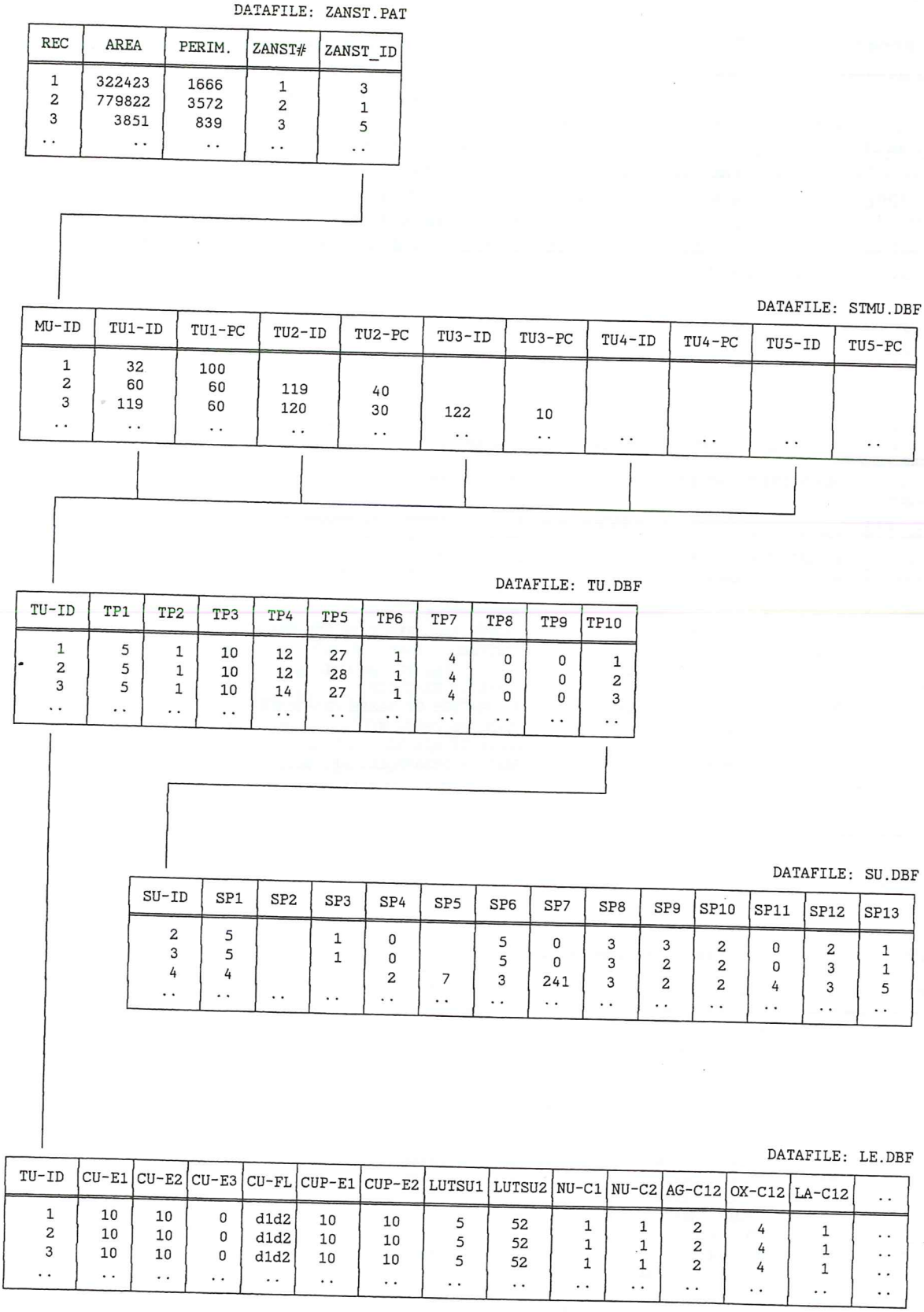


FIGURE 2.1 Relate structure of SIESTA datafiles

3 DESCRIPTION OF FILES

3.1 DIRECTORY STRUCTURES

SIESTA comprises many files that have to be arranged conveniently. Therefore files are clustered in separate directories. A coverage (i.e. a map) has to be stored in a workspace. A workspace is a certain directory that contains an INFO subdirectory. The INFO directory stores all database files. Workspaces are generated with the ARC command *CREATEWORKSPACE*.
In figure 3.1 a scheme of directories and workspaces of the workarea {COSTA} is shown. The workspace [COS] contains all SIESTA data, whereas workspace [STARING] stores only those files needed to make several plots on A1-paper size. The directory {TEMP} stores data that are no part of SIESTA.
Workspace [ZAN] stores soil and land information of the North eastern Atlantic Zone. Workspace [ROAD] stores topographic information of the North eastern Atlantic Zone. Information for smaller areas within the Atlantic Zone is stored in the workspaces [GCM], [NEG], [POC] and [FLD]. Land use information can be found in workspace [GRS]. The workspace [TOPS] contains the clipping edges of 1:50000 topsheets. Photo clipping edges can be found in workspace [AP80]. Other information is stored in the workspace [KLAD].

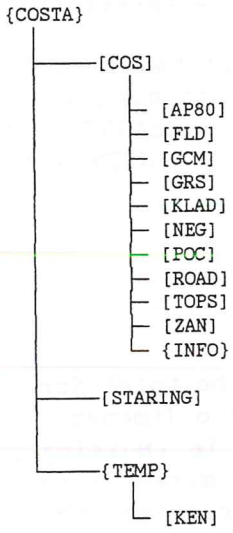


FIGURE 3.1 Directory structure of workarea {COSTA}. Normal directories are indicated with accolades: {...}, workspaces are indicated with brackets: [...]. All workspaces have {INFO} subdirectories, however in the scheme this subdirectory is only indicated for workspace [COS].

3.2 MAP COVERAGES

The coverage is the basic unit of storage in ARC/INFO. It contains geometric data and thematic attributes for objects in a given area. The features on the coverage have a location on the map and possibly attributes which describe it. In SIESTA most coverages do have polygon topology, the features on the map represent for example mapping units. Only the topographic maps have line topology. Feature attribute tables (datafiles like STMU.DBF, TU.DBF and TOPO.DBF) are linked to the coverages to store the thematic data.
In this chapter the most important coverages are mentioned, a more detailed description can be found in annex 4. A list of all coverages can be found in annex 1.

3.2.1 Soil and land information

The coverage <ZANST> contains information of soil and land. ZANST is an abbreviation of 'Zona Atlantica Noreste Suelos y Tierras'. The features on the map (polygons) have identifiers (MU-ID's) to which the thematic information can be linked. The data are stored in the datafiles STMU.DBF, TU.DBF, SU.DBF and LE.DBF (see figure 2.1 and annex 5). The map covers an area larger than 550000 ha.
In order to be able to generate in a fast manner specific plots of small areas, which are situated within the Atlantic Zone, three other coverages are created. The coverages <GCM>, <NEG> and <POC> are clipped from <ZANST> and more easily manipulated within ARC/PLOT. They are equal to <ZANST> with exception of their size.

3.2.2 Land use information

Land use information is stored in the coverages <ZANLUZ>, for the total North eastern Atlantic Zone and <LUZGRST>, for the area of Guacimo, Rio Jimenez and Siquirres. Additional information of these maps can be found in (Huising & Wielemaker, 1993). The information of <LUZGRST> and <ZANST> is merged into a new coverage. With the command *UNION* a coverage <PMULUZD> is created, which can be used for the execution of queries about relations between soil and land use (Huising & Wielemaker, 1993).

3.2.3 Administrative information

District boundaries within the Atlantic Zone are stored in the coverage <ZANADM>. In the coverage <ZANIDA> and the datafile ZANIDA.ALT information on IDA-settlements is recorded. Clip windows that can be used to select areas covered by a certain topsheet are listed in annex 8. Some examples are: Agua Fria, Tortuguero, Rio Sucio.

3.2.4 Topographic information

The coverage <ZANTOP> contains the topography of an area which is slightly larger than the area of coverage <ZANST>. In table 2.3 is shown what kind of topography is distinguished. Several clip operations are executed to create the following coverages: <ZANRR>, <GCMRR>, <NEGRR> and <POCRR>.

3.2.5 Different kind of information

An ecological map with life zones according to TSC, 1985 is presented by coverage <ZANZV>.
A detailed soil map of finca Los Diamantes is available as coverage <FLDST>. Soils were mapped at a scale of 1:10000, with a different methodology, so the data structure is not equal to the SIESTA structure.

3.3 INFO FILES

3.3.1 Coverage inherited files

Topologic information of a coverage is stored in either a Polygon Attribute Table (PAT-file), in case of polygon topology or an Arc Attribute Table (AAT-file), in case of line topology. For example the coverage <ZANST> has an INFO file named ZANST.PAT. For each polygon on the map it records the area, the perimeter, an internal number (ZANST#) and a user identifier (ZANST-ID). Additional items can be added in order to store polygon data. This file must always be ordered on the ZANST#. If it is not correctly ordered then the data are unpredictably linked to coverage ZANST. In that case data analysis and data representation within ARC/PLOT make no sense.
The TIC-file (e.g. ZANRR.TIC) registers the geographic control points for a coverage. The SIESTA coverages are registered to the same coordinate systems as the 1:50000 topsheets with units in meters. In the BND-file (e.g. ZANRR.BND) the coverage extent is stored as extreme maximum and minimum coordinates of coverage arcs and label points.

3.3.2 Data files

▲ *Primary datafiles: STMU.DBF, TU.DBF & SU.DBF*

In SIESTA Mapping Units, Terrain Units and Soil Units are distinguished. The data of these units are stored in three files: STMU.DBF, TU.DBF and SU.DBF (see annex 5).
Figure 3.2 shows the items and item definitions of file TU.DBF. The Terrain Units are identified by a number (TU-ID) and described by Terrain Properties TP1 ... TP10. The names of the Terrain Properties, which can be seen as attributes, are given in table 2.1. The definitions of the attribute values can be found in annex 5 (see also §3.2.3). Each Terrain Unit is a unique combination of Terrain Property attribute values, as illustrated in Table 3.1.
The Soil Units are identified by the soil unit identifier (SU-ID) and described by the Soil Properties SP1 ... SP13 (see table 2.2). In figure 3.3 the item definitions of SU.DBF are shown. The meaning of the item values, i.e. the attribute value definitions, can be found in annex 5.
The file SU.DBF has a redefined item TP10, this item has the same definitions as the item SU-ID. As a consequence the item SU-ID has two names (another way to create this situation is the assignment of an alternate name, instead of an item redefinition). So it is possible to relate files SU.DBF and TU.DBF on the item they have in common: TP10. By means of this relate, soil information is available for all Terrain Units.
Several Terrain Units can occur within one Mapping Unit. The file STMU.DBF records the Mapping Unit composition, the TU-ID's and their percentage of coverage within the Mapping Unit is indicated. Each Mapping Unit has a unique composition and is indicated by a MU-ID. The item definitions of file STMU.DBF are shown in figure 3.4. Item TU1-ID stores the TU-ID of the most dominant Terrain Unit. TU1-PC stores the percentage of the area covered by this Terrain Unit. Identifiers of less dominant terrain Units are stored in items TU2-ID to TU5-ID.
For a certain Mapping Unit information of Terrain Properties is available only if file STMU.DBF is related to file TU.DBF. This relate can be established if the item TU-ID of file TU.DBF has five redefined items, named TU1-ID ... TU5-ID (see figure 3.2). To guarantee proper relates the files STMU.DBF, TU.DBF and SU.DBF have to be sorted each on its key-item, which is respectively item

MU-ID, TU-ID and SU-ID.
File STMU.DBF is joined with the PAT-file of a coverage, in order to facilitate data display in ARC/PLOT environment (see §4.2.1).

DATAFILE NAME: TU.DBF 11 ITEMS: STARTING IN POSITION 1

COL	ITEM NAME	WDTH	OPUT	TYP	N.DEC	ALTERNATE NAME
1	TU-ID	4	5	B	0	
5	TP1	2	2	C	-	
7	TP2	4	2	B	0	
11	TP3	2	2	C	-	
13	TP4	2	2	C	-	
15	TP5	2	2	C	-	
17	TP6	2	2	C	-	
19	TP7	2	2	C	-	
21	TP8	2	2	C	-	
23	TP9	2	2	C	-	
25	TP10	4	5	B	0	
	** REDEFINED ITEMS	**				
1	TU1-ID	4	5	B	0	
1	TU2-ID	4	5	B	0	
1	TU3-ID	4	5	B	0	
1	TU4-ID	4	5	B	0	
1	TU5-ID	4	5	B	0	
25	ASU1	4	5	B	0	
25	ASU2	4	5	B	0	
5	PHYS-CODE	12	12	C	-	

FIGURE 3.2 Item definitions of Datafile TU.DBF. Explanation: WDTH = width of the item, OPUT = output width of the item, TYP = item type (e.g. binary (B), or character (C)), N.DEC = number of decimals.

DATAFILE NAME: SU.DBF 29 ITEMS: STARTING IN POSITION 1

COL	ITEM NAME	WDTH	OPUT	TYP	N.DEC	ALTERNATE NAME
1	SU-ID	4	5	B	0	
5	SU-HA	5	10	B	0	
10	SU-NM	30	30	C	-	
40	SK1	1	1	C	-	
41	SK2	2	2	C	-	
43	SK3	3	3	C	-	
46	SK4	4	4	C	-	
50	SK5	5	5	C	-	
55	SK6	6	6	C	-	
61	SP1	1	1	C	-	
62	SP2	1	1	C	-	
63	SP3	1	1	C	-	
64	SP4	1	1	C	-	
65	SP5	2	2	C	-	
67	SP6	1	1	C	-	
68	SP7	3	3	C	-	
71	SP8	1	1	C	-	
72	SP9	1	1	C	-	
73	SP10	1	1	C	-	
74	SP11	1	1	C	-	
75	SP12	1	1	C	-	
76	SP13	1	1	C	-	
77	ST1	1	1	C	-	
78	ST2	3	3	C	-	
81	ST3-P1	5	5	C	-	
86	ST3-P2	5	5	C	-	
91	ST4-P1	5	5	C	-	
96	ST4-P2	5	5	C	-	
101	SU-NDX	4	5	B	0	
	** REDEFINED ITEMS	**				
1	TP10	4	5	B	0	
1	ASU1	4	5	B	0	
1	ASU2	4	5	B	0	

FIGURE 3.3 Item definitions of Datafile SU.DBF

▲ *Analytically derived datafiles*

Information that results from data analysis is stored separately from the primary datafiles. In most cases the data entry is automated. After the correction of primary data, the update of secondary data is simple with the use of info programs (annex 2, annex 7). Three examples of these are files LE.DBF, SULUT.DBF and ASU.DBF

Datafile LE.DBF (see annex 5) stores Landevaluation data per TU-ID. To recalculate the data of suitability ratings stored in items LUTSU1 and LUTSU2 the program LUTSU.PRG can be run. The results of the program are written to file LUTSU.DBF and can easily be copied to datafile LE.DBF. Recalculations of various requirements and related suitability ratings (items NU-C1 ... LSU-C2) are done with program REQ.PRG. The results are written to file REQ.DBF and can be copied to LE.DBF.

Datafile SULUT.DBF stores information per MU-ID. For all suitability classes of items LUTSU1 and LUTSU2 of file LE.DBF the area percentage they cover within a Mapping Unit is given. The program SULUT.PRG generates the content of this file. For all Terrain Units within a Mapping Unit the suitability class is examined, and the percentage of area coverage of specified TU is added to the percentage of matching suitability class in file SULUT.DBF. As a result SULUT.DBF stores the distribution of suitability classes within each Mapping Unit.

File ASU.DBF stores all possible combinations of two soils (soil associations) that do occur in specified Mapping Units. The program SMASU.PRG is used to record all soil associations per MU-ID in file SMASU.PRG. The program ASU.PRG generates the content of file ASU.DBF, per soil association the names of the soils and the Mapping Units where these associations do occur are recorded (see also §6.2.2).

DATAFILE NAME: STMU.DBF 12 ITEMS: STARTING IN POSITION 1

COL	ITEM NAME	WDTH	OPUT	TYP	N.DEC	ALTERNATE NAME
1	MU-ID	4	5	B	0	
5	MU-HA	4	10	B	1	
9	TU1-ID	4	5	B	0	
13	TU1-PC	2	3	B	0	
15	TU2-ID	4	5	B	0	
19	TU2-PC	2	3	B	0	
21	TU3-ID	4	5	B	0	
25	TU3-PC	2	3	B	0	
27	TU4-ID	4	5	B	0	
31	TU4-PC	2	3	B	0	
33	TU5-ID	4	5	B	0	

FIGURE 3.4 Item definitions of Datafile STMU.DBF

TABLE 3.1 Selection records of Datafile TU.DBF

REC	TU-ID	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10
6	131	1	8	3	1	1	5	4	2	4	34
7	132	1	8	3	1	2	5	4	0	0	34
8	102	1	8	3	1	5	2	1	3	4	48
9	15	1	8	3	1	5	4	1	3	4	48
10	103	1	8	3	1	5	6	1	3	4	48
2	33	1	8	1	1	2	5	3	0	0	39
3	130	1	8	1	1	2	5	4	0	0	44
134	72	4	2	9	9	20	1	4	0	0	33
135	71	4	2	9	9	20	1	4	0	0	47

3.3.3 Descriptive files

Several files document the meaning of items and item values of previously described datafiles. For example file TU.DBF has the items TP1, TP2 ... TP10 datafile TP.DBF gives a description in English and Spanish of these item names: TP1 means physiography or fisiografía (see table 2.1). Likewise the attribute values of the physiography are described in datafile TP1.DBF (see table 3.2). All descriptive files are presented in annex 5. The files that record attribute values do also have an item to store data on the number of hectares. The item TP1-HA of file TP1.DBF stores the total number of ha that each physiographic unit has within coverage <ZANST>. The area calculations are discussed in §6.2.1.
The descriptive files are used on the one hand to describe the meaning of certain codes, on the other hand to enable automatic legend generation (see chapter 7).

3.3.4 Program files

Program files do have the extension '.PRG'. They are created within the program editor of INFO using the commands *PROGRAM* and *CHANGE*. Once created they are easily edited in a simple text editor like the VMS-editor (use the command: *EDIT <program name>*). To run a program use the command: *RUN <program name>*.

3.3.5 ARC/PLOT supporting files

Within ARC/PLOT it's possible to create a RELATE-file. This is an INFO file which has the extension '.REL' and stores relates between a coverage and a number of datafiles. File LE.REL (see table 4.2) is an example.
Information on objects on a map can be stored in Attribute Lookup Tables, for example file ZANIDA.ALT.
A Symbol Lookup Table is used to assign symbols to coverage features . It stores symbol numbers and item values of a specific item of a datafile which is related to the coverage. These numbers are used to shade areas or to drop lines of areas on a map (see §4.1).

TABLE 3.2 Description of physiographic attribute values (file TP1.DBF)

TP1	TP1-HA	DESCRIPTION ENGLISH	DESCRIPTION SPANISH
1	77425	VOLCANIC AREAS	AREAS VOLCANICAS
2	32126	FOLD-MOUNTAINS	MONTANAS DE PLEGAMIENTO
3	352023	ALLUVIAL AREAS	AREAS ALUVIALES
4	13213	LITTORAL AREAS	AREAS LITORALES
5	68170	MOORLANDS	AREAS DE TURBERA

3.4 DIFFERENT KIND OF FILES

Besides coverages and INFO files some other types of files can be found on a workspace: AML files, TXT files, keyfiles, shadesets.
AML files are program files used within the ARC/PLOT module using the command *&RUN <program name>*. These programs can be used to draw maps based on SIESTA data. All existent AML's are listed in annex 6.
Files with the extension '.TXT' are used by AML-programs. They contain English (e.g LEGTIT-E1.TXT) or spanish text (e.g. LEGTIT-S1.TXT) which is plotted on maps created by the AML's.
A keyfile is used to plot a legend on a map. The file has the extension '.KEY' and contains color numbers and names of legend units as illustrated in figure 3.5. The keyfile can be created with a text editor; however several INFO programs do generate keyfiles (see §7.2). There are english as well as spanish keyfiles (e.g. SP13-E.key, SP13-S.key).
Shadesets are generated with the ARC module SHADEEDIT. On the workspaces four types of shadeset files occur. They are easily recognized by their names as shown by the following listing of shadesets, used to shade physiographic maps:

- fill pattern, color tone: TP1-FC.SHD
- fill pattern, grey tone: TP1-FG.SHD
- hatched pattern, color tone: TP1-LC.SHD
- hatched pattern, grey tone: TP1-LG.SHD

```
.1
VERY SUITABLE
.2
SUITABLE
.3
MODERATELY SUITABLE
.4
NOT SUITABLE
.5
NO INFORMATION
```

FIGURE 3.5 Keyfile SUC-E.KEY

4 DATA PRESENTATION

4.1 ARC/INFO PRINCIPLES

Maps are drawn in the module ARCPLOT. Within ARCPLOT it is possible to specify different symbols to represent different features. The symbols are assigned to features according to the attributes stored in the coverage feature attribute table. Attribute items from a coverage's feature attribute table (e.g. STMU.DBF, TU.DBF) can be used directly as symbol numbers. Another method is to build a lookup table to assign symbol numbers to features.
ARCPLOT can interpret item values as symbol numbers provided that they have a numeric data type definition. In figure 4.1.A is shown how the item values of the table MAP-A.PAT are used as symbol numbers.
In figure 4.1.B the more flexible approach, the use of lookup tables to assign symbols to features, is shown. Any item of a coverage feature attribute table can be used as a lookup item to a lookup table. The lookup table stores values of the lookup item and symbol numbers. To draw a coverage feature, ARCPLOT reads the value in the feature attribute table MAP-B.PAT and then finds this value in the lookup table SOIL.SLT to obtain the assigned symbol number.

4.2 SIESTA MAP PRODUCTS

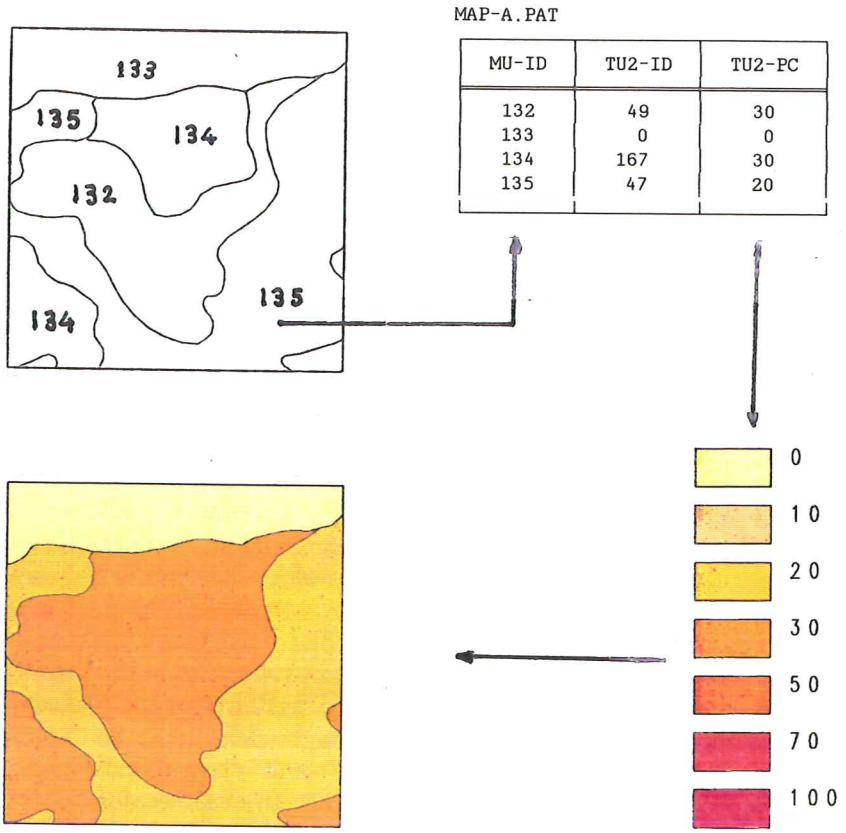
4.2.1 File relates

To be able to present soil and land information on a map, connections between various files must be established. Within ARC/PLOT it is possible to relate a datafile to a coverage on the user-ID. So if Terrain Unit information has to be presented then the datafile TU.DBF must be linked to a coverage e.g. <ZANST>. Unfortunately the files ZANST.PAT and TU.DBF do not have a common item. ZANST.PAT stores ZANST-ID's which are MU-ID's, whereas TU.DBF stores data per TU-ID. The relation between Terrain Units and Mapping Units is defined in the Mapping Unit composition table (STMU.DBF). Figure 2.1 shows how these files can be related to each other. However, because of software restrictions it is impossible to relate file ZANST.PAT to STMU.PAT on the MU-ID and at the same time relate TU.DBF to STMU.DBF on the TU-ID. Therefore file STMU.DBF is joined with file ZANST.PAT. To join both files the following command must be entered from the 'Arc:' prompt:

```
Arc: JOINITEM ZANST.PAT STMU.DBF ZANST.PAT MU-ID ZANST-ID LINEAR
```

This command is executed successfully only when item ZANST-ID of file ZANST.PAT has the alternate name MU-ID (use INFO-command *ALTER*). Once STMU and PAT are joined then the PAT-file and the TU.DBF can be related.
Within ARC/PLOT a relate can be established which can also be stored in a relate file, i.e. an INFO datafile (see ARC/PLOT-command *RELATE*). Table 4.1 gives an example of the relate file TU.REL. The file has five records, defining 5 relations. The first relation is named TU1 it relates the PAT-file

A



B

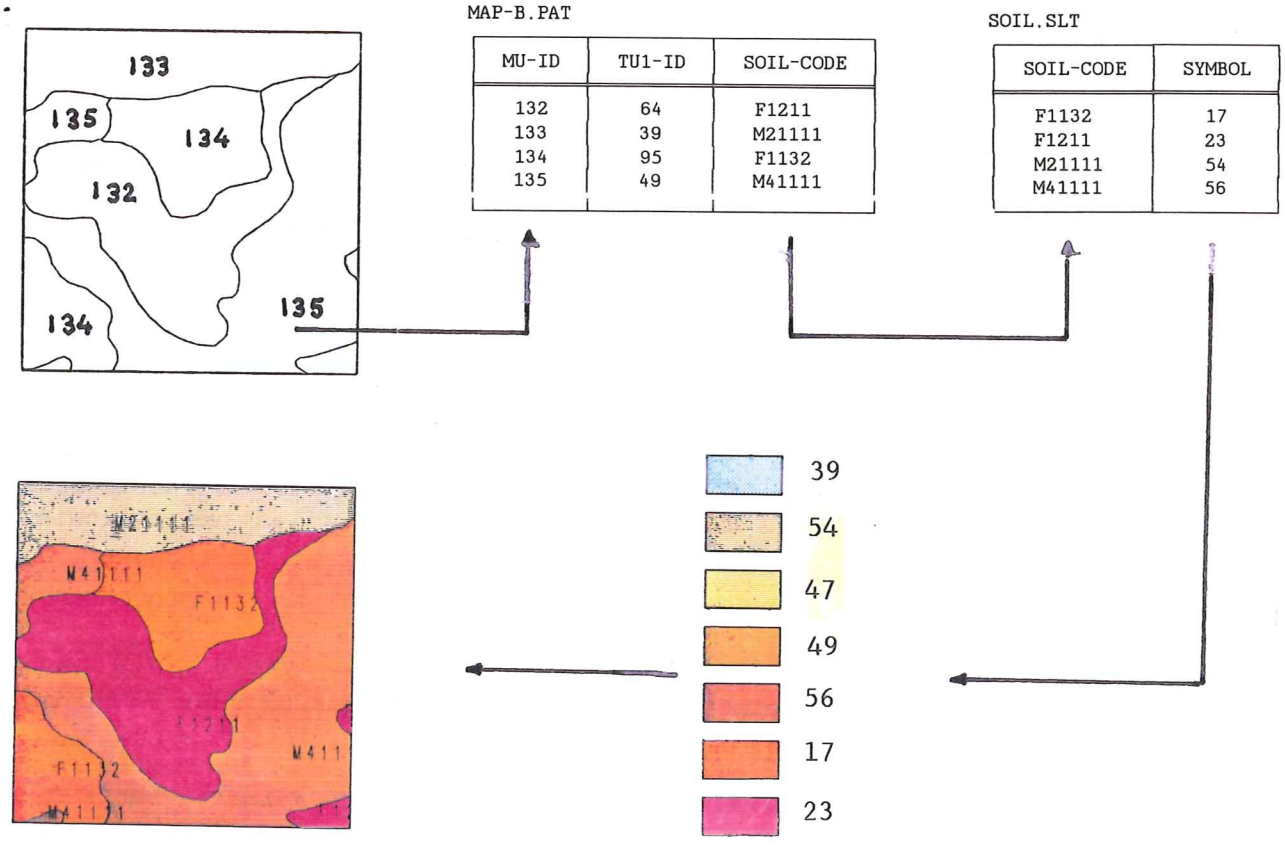


FIGURE 4.1 Methods to shade coverage features. A. with use of a feature attribute table only, B. with use of a feature attribute table and a symbol lookup table.

to datafile TU.DBF which can be found in the INFO database. The item TU1-ID is related with the item TU-ID of data file TU.DBF. The relate is of the type 'ordered', this implies that file TU.DBF must be sorted on the relate item TU-ID. Likewise the other four relates can be interpretated. During an ARC/PLOT session these 5 relates can be established by entering the command: *RELATE RESTORE TU.REL*. Next the information on for example the dominant Terrain Unit (TU1) is available by invoking the relate TU1.
The use of relates can be avoided when during data processing the information is converted to a format with the MU-ID as key item. The generated file could serve as a symbol lookup table.

4.2.2 Plot with use of relate functions: Geology

The handling of file relates can best be illustrated by making a plot of the geology of coverage <ZANST>. Suppose that the PAT-file is already joined with the STMU.DBF, and the relate file TU.REL exists.
The geology, a Terrain Property (TP2), stored in table TU.DBF, can be plotted if the relates are established correctly. However, first must be checked what types of geology do occur in the database (and on the coverage). Because a shadeset has to be created to represent these soils on the map with a certain shadepattern. File TP2.DBF (annex 5) records 15 geological units. To each

TABLE 4.1 Datafile TU.REL

```
      1
RELATION      =TU1
TABLE-ID      =TU.DBF
DATABASE      =INFO
ITEM          =TU1-ID
COLUMN        =TU-ID
TYPE          =ORDERED
      2
RELATION      =TU2
TABLE-ID      =TU.DBF
DATABASE      =INFO
ITEM          =TU2-ID
COLUMN        =TU-ID
TYPE          =ORDERED
      3
RELATION      =TU3
TABLE-ID      =TU.DBF
DATABASE      =INFO
ITEM          =TU3-ID
COLUMN        =TU-ID
TYPE          =ORDERED
      4
RELATION      =TU4
TABLE-ID      =TU.DBF
DATABASE      =INFO
ITEM          =TU4-ID
COLUMN        =TU-ID
TYPE          =ORDERED
      5
RELATION      =TU5
TABLE-ID      =TU.DBF
DATABASE      =INFO
ITEM          =TU5-ID
COLUMN        =TU-ID
TYPE          =ORDERED
```

TP15-code a shading has to be assigned. So from the 'Arc:' prompt the shadeedit module has to be invoked. For symbol numbers 1 to 15 a matching shade to corresponding TP2-codes must be defined; also a spare symbol e.g. 99, which has no shade at all, must be defined [1] (see chapter 9 for remarks on shadeset colors). Now within ARC/PLOT for each polygon of the coverage the value of item TP2 of file TU.DBF can be searched and the polygon is shaded with the corresponding symbol. The following command sequence must be entered to generate the plot:

```
1-      Arc: DISPLAY 9999 3
2-      Arc: AP
3-      Arcplot: MAPEX ZANST
4-      Arcplot: RELATE RESTORE TU.REL
5-      Arcplot: SHADESET TP2-DEMO.SHD
6-      Arcplot: POLYGONSHADE ZANST TU1//TP2
```

Explanation of commands:
1- Define display device, a code for a DECTERM is entered. On a TEKTRONIX-4208 two commands have to be entered: *&TERMINAL 4208 / DISPLAY 4208*. To obtain same color definitions on the DECTERM (display 9999 3) as on the TEKTRONIX enter within ARC/PLOT the command *SETTEKCOL* (See also chapter 9).
2- Start ARC/PLOT session, *AP* is the abbreviation of the command *ARCPLOT*.
3- Enter mapextension. To display information for a smaller area e.g. Neguev area enter the command: *MAPEX NEG*, if coverage <NEG> doesn't exist in the present workspace then add the pathname to the coverage name; the command is: *MAPEX [COSTA.COS.NEG]NEG*.
4- Establish relates.
5- Declare the shadeset that has to be used for the shading of polygons.
6- Shade polygons of coverage <ZANST>, use data of item TP2 (of file TU.DBF) which is connected to the coverage via the relate named TU1. The plot shows information of the dominant Terrain Unit. A plot of the geology is shown in figure 6.2

4.2.3 Plot with use of relates and symbol lookup table: physiography

In the former example item TP2, a numeric item, was used to shade the plot. In case of character items it is impossible to shade a plot in that manner. A symbol lookup table has to be used to translate the item values in to numeric values, so 'communication' between coverage and shadeset is possible via the lookup table. Most items of file TU.DBF are character items [2] (see figure 3.2). For shading information of physiography, stored in the character item TP1 of file TU.DBF, a symbol lookup table must be used. Within Arcplot the following command sequence must be entered:

---

[1] The spare symbol causes polygons on the map that have none of the TP1-code values e.g. sea, lakes, not mapped areas, to be shaded blanc; if no spare symbol is defined it's unpredictable what other shadings will be used to shade these polygons.

[2] Character items were introduced to handle the problem of missing values. A character item can contain numeric codes: '0', '1', '2' etc. as well as blanks: ' '. The numeric values have a meaning, e.g. TP8-code 0 means 'no stones or very few stones', a blank indicates 'no information is available'. If instead a field of a numeric item is left blank (no value is entered), then automatically the value 0 is generated, the result is a classification of value 0 which might not be the same as 'no information'.
Another way to handle missing values is the introduction of a standard missing value, for example 999, which can be more conveniently used in numeric items. See also chapter 9 for remarks on the disadvantages of the use of character items.

```
1-      Arcplot: MAPEX ZANST
2-      Arcplot: RELATE RESTORE TU.REL
3-      Arcplot: SHADESET TP1-FC.SHD
4-      Arcplot: POLYGONSHADE ZANST TU2//TP1 TP1.SLT
```

Explanation of commands:
3- Use shadeset TP1-FC.SHD which stores the color codes for the five physiographic units.
4- Shade the polygons of coverage <ZANST>, use data of item TP1 (of file TU.DBF) which is connected to the coverage via the relate named TU2. The plot shows information for the second most dominant Terrain Unit.

4.2.4 Plot of processed data: suitability classes

The interpretation of primary data gives rise to new data. The information can be stored in new tables, dependant on the kind of information, per MU-ID or per TU-ID. Landevaluation data are stored in datafile LE.DBF per TU-ID. Suitability classes for major land use types (Wielemaker et al., 1992) are assigned to Terrain Units (see §5.2) the data are stored in file LUTSU.DBF (a working file, if it contains correct data, then these can be copied to the more definitive file LE.DBF). After having restored the relate LE.REL (table 4.2), the suitability subclasses (recorded in item LUTSU2) can be plotted using the following command sequence:

```
1-      Arcplot: MAPEX ZANST
2-      Arcplot: RELATE RESTORE LE.REL
3-      Arcplot: SHADESET SC-FC.SHD
4-      Arcplot: POLYGONSHADE ZANST LUTSU2//LUTSU2
```

Explanation of commands:
4- Shade polygons of coverage <ZANST>, use data of item LUTSU2 (of file LUTSU.DBF) which is connected to the coverage via the relate named LUTSU2. The result is a plot which indicates for each mapping unit the suitability class of the dominant Terrain Unit. The plot of major suitability classes (LUTSU1) shown in figure 6.3 is generated in a similar way.

Totally different information can be displayed after a rearrangement of data. File SULUT.DBF stores the percentage distribution of suitability classes within mapping units (see §5.3). For example, this file has an item MSC-1 which records for each MU-ID the percentage of area coverage of suitability class 1. The suitability distribution for a specified class can be plotted with the following command sequence:

```
1-      Arcplot: MAPEX ZANST
2-      Arcplot: RELATE RESTORE LE.REL
3-      Arcplot: SHADESET MSC5-FC.SHD
4-      Arcplot: POLYGONSHADE ZANST LUTSU1//MSC-5 MSC5.SLT
```

Explanation of commands:
Remark: commandlines 1 and 2 need not to be repeated each time.
4- Shade polygons of coverage <ZANST>, use data of item MSC-5 (of file SULUT.DBF) which is connected to the coverage via the relate named LUTSU1. The plot displays percentage division (within each MU) of areas that need to be protected (suitability class 5). Likewise a plot of percentage of area suitable for requiring crops (MSC-1) can be made (see figure 5.3).

TABLE 4.2 Datafile LE.REL stored on workspace [ZANST]

```
      1
RELATION      =TU1
TABLE-ID      =LE.DBF
DATABASE      =INFO
ITEM          =TU1-ID
COLUMN        =TU-ID
TYPE          =ORDERED
      2
RELATION      =TU2
TABLE-ID      =LE.DBF
DATABASE      =INFO
ITEM          =TU2-ID
COLUMN        =TU-ID
TYPE          =ORDERED
      3
RELATION      =TU3
TABLE-ID      =LE.DBF
DATABASE      =INFO
ITEM          =TU3-ID
COLUMN        =TU-ID
TYPE          =ORDERED
      4
RELATION      =TU4
TABLE-ID      =LE.DBF
DATABASE      =INFO
ITEM          =TU4-ID
COLUMN        =TU-ID
TYPE          =ORDERED
      5
RELATION      =TU5
TABLE-ID      =LE.DBF
DATABASE      =INFO
ITEM          =TU5-ID
COLUMN        =TU-ID
TYPE          =ORDERED
      6
RELATION      =LUTSU1
TABLE-ID      =SULUT.DBF
DATABASE      =INFO
ITEM          =MU-ID
COLUMN        =MU-ID
TYPE          =ORDERED
      7
RELATION      =LUTSU2
TABLE-ID      =LUTSU.DBF
DATABASE      =INFO
ITEM          =TU1-ID
COLUMN        =TU-ID
TYPE          =ORDERED
```

4.3 SIESTA DATABASE OUTPUT

At least as important as map products, is the output of information demanded by specific queries of the databases. The REPORT option implemented in the INFO database system offers some tools to generate reports. The generation of a report can be time consuming and may not always hit the mark. Often sufficient information is provided by relatively simple listings of selections of several related databases. However, for the sake of reproducibility INFO-programs are preferably used in case of more complex queries. The use of 'working files' to store data may be a requisite.
Within the INFO-database there are various ways to relate datafiles and extract data. The methods of data manipulation are easiest deduced from the INFO-programs discussed in §6.2. In these programs the listing of some

datafiles is automated. By running a program information about e.g. associations of soils or soil phases is acquired. Table 4.3 gives a part of the results of program ASU.PRG. Other programs expose database information by generating information represented in keyfiles (see §7.2).
In annex 5 listings of the primary datafiles are found. Representation of these files in that way is possible after exportation (use the command *EXPORT*, invoked from the 'Arc:' prompt) and further importation in a text editor running on PC.

TABLE 4.3 Soil associations (file ASU.DBF)

ASU-NDX	ASU-1	ASU1-NM	ASU-2	ASU2-NM	MU-ID's
1	1	CANO BRAVO	65	BARRO-1	44 72
2	1	CANO BRAVO	72	FLORES-1	44
3	1	CANO BRAVO	55	SARDINA	44
4	1	CANO BRAVO	11	NEGUEV	72
5	2	CANO NEGRO	3	CANO MORENO	5
6	2	CANO NEGRO	65	BARRO-1	90
7	2	CANO NEGRO	66	BARRO-2	50
8	2	CANO NEGRO	55	SARDINA	50
9	3	CANO MORENO	64	LIQUIDO	27 66
10	3	CANO MORENO	65	BARRO-1	3 4 47 70
11	3	CANO MORENO	66	BARRO-2	27 50 66
12	3	CANO MORENO	33	TORTUGUERO	32
13	3	CANO MORENO	47	MONTELIMAR	71
14	3	CANO MORENO	55	SARDINA	50 71
15	3	CANO MORENO	58	COPE MALANGA	25
16	3	CANO MORENO	61	PERLA	25
17	3	CANO MORENO	10	COCORI	70 71
18	3	CANO MORENO	11	NEGUEV	3
19	64	LIQUIDO	66	BARRO-2	27 66
20	65	BARRO-1	69	BARRA	52
21	65	BARRO-1	72	FLORES-1	44
22	67	AGUA FRIA	71	QUEBRADA	79 91
23	68	SAN RAFAEL	72	FLORES-1	87
24	68	SAN RAFAEL	73	FLORES-2	22
25	22	RIO MOLINO	30	CHIRRIPO	149 154
26	22	RIO MOLINO	57	SUERRE	149 154
27	24	RIO CRISTINA	72	FLORES-1	172
28	24	RIO CRISTINA	25	CARTAGENA	172
29	24	RIO CRISTINA	37	JIMENEZ	172
30	24	RIO CRISTINA	52	SANTA CLARA	118 127
31	25	CARTAGENA	72	FLORES-1	172
32	25	CARTAGENA	37	JIMENEZ	172
33	25	CARTAGENA	60	LIGIA	126
34	27	MERCEDES	47	MONTELIMAR	122
35	28	LOS DIAMANTES	67	AGUA FRIA	121
36	28	LOS DIAMANTES	31	HORQUETAS	67
37	28	LOS DIAMANTES	47	MONTELIMAR	120 123
38	28	LOS DIAMANTES	60	LIGIA	61 62 63
39	30	CHIRRIPO	57	SUERRE	149 154

5 DATA PROCESSING

5.1 DATA CALCULATION

Within ARC/INFO some standard calculations can be done, for example using the command: *STATISTICS*. However, specific SIESTA calculations are not supported by ARC/INFO. Therefore, INFO-programs are written to execute most of the computations.
The number of hectares each Mapping Unit takes up on a coverage can be stored in item MU-HA of file STMU.DBF. The steps in calculating these figures are: 1) select the PAT file, 2) relate file STMU.DBF to it, 3) erase in file STMU.DBF the results of previous calculations 4) for each record in the PAT-file (i.e each polygon of the coverage) do calculate: AREA / 10000, enhance the number of MU-HA of matching record in file STMU.DBF with the calculated value. This calculation is executed by the INFO-program MU-HA.PRG. Other calculations like the number of hectares for TP-attribute values can be executed with the program TP-HA.PRG.
Information on hectares and percentages of coverage that is provided in some keyfiles is obtained while running a program which generate specified keyfiles (see §7.2).

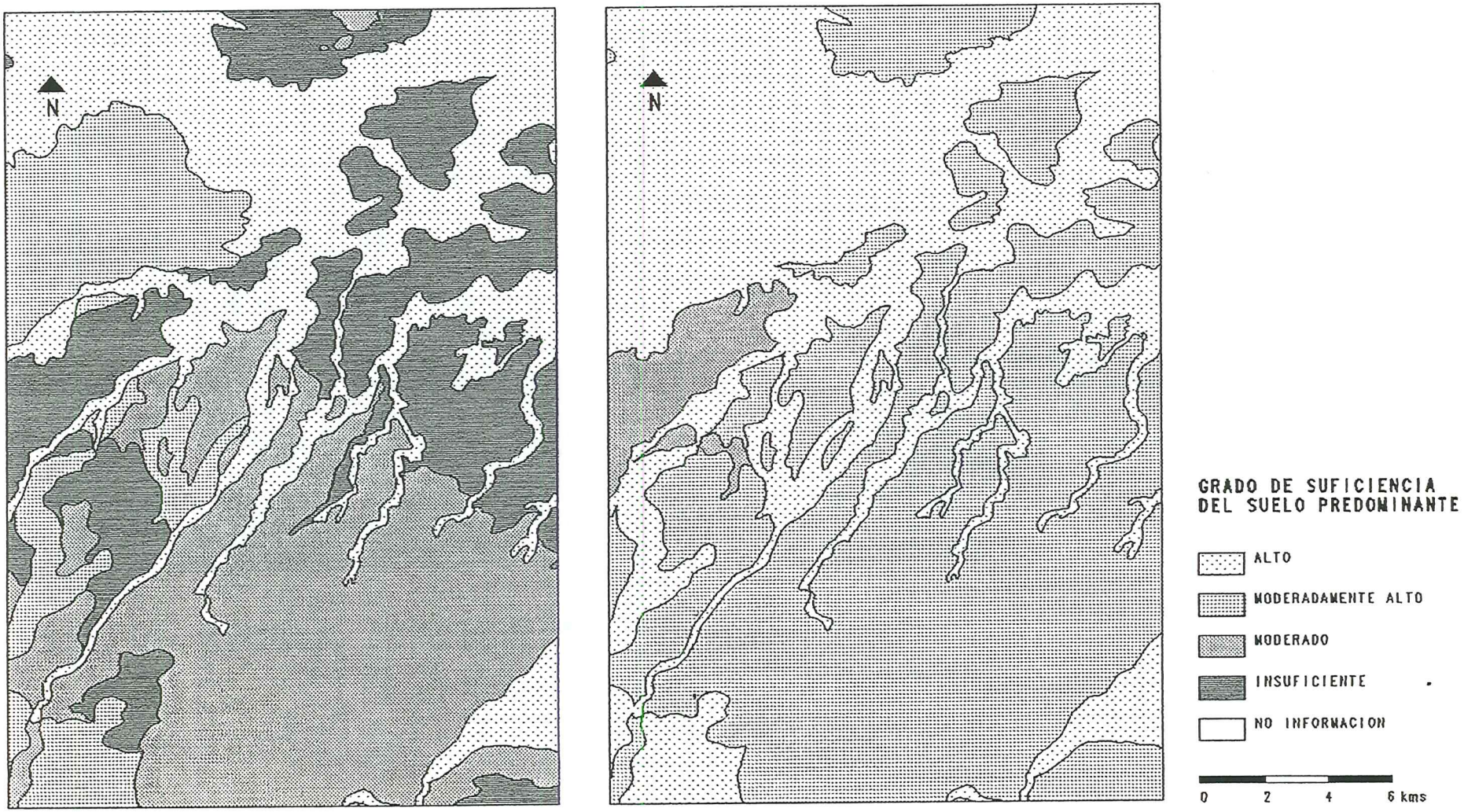
5.2 DATA INTERPRETATION

5.2.1 Suitability calculations

As mentioned before, terrain and soil properties can be evaluated and according to a certain way of data interpretation, class labels can be assigned to TU's or MU's. The suitability classes represented by the items LUTSU1 and LUTSU2 of file LE.DBF are calculated by evaluating items TP6, TP8, TP9, SP6, SP11, SP13. The classification for major land use types is described in Wielemaker 1992. The evaluation procedure in which the mentioned properties are translated in suitability classes and stored in a new datafile as illustrated by the INFO-program LUTSU.PRG.
Files SU.DBF and LUTSU.DBF are related to file TU.DBF. LUTSU.DBF stores the results of the evaluation of data of both other files. Each TU-ID is classified by application of several assignation rules, for example: **IF** the slope (TP6) is greater then >20% (> class 4), or the soil is very poorly drained (SP11, class 0), and the surface stoniness (TP9) is over 15% (> class 3), **THEN** classify as MSC-5, so for this record write value '5' to item LUTSU1; **ELSE** ... etc.

Figure 5.1 Plot of nutrient requirements (NU-C1, NU-C2)

AREA DE NEGUEV REQUERIMIENTO DE NUTRIENTES

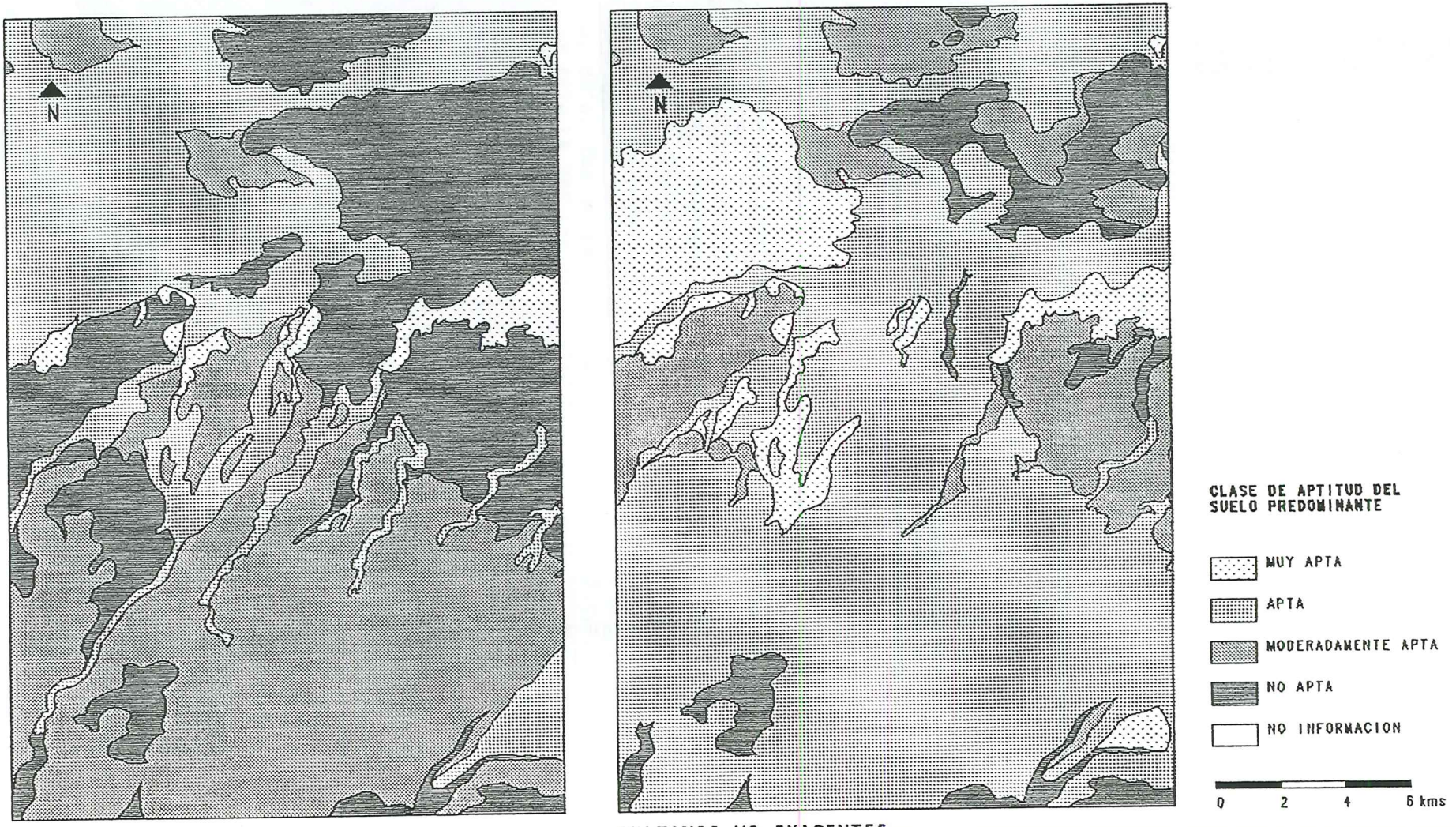


CULTIVOS EXIGENTES

CULTIVOS NO EXIGENTES

Figure 5.2 Plot of Suitability classes (LSU-C1, LSU-C2)

AREA DE NEGUEV EVALUACION DE LA APTITUD



CULTIVOS EXIGENTES

CULTIVOS NO EXIGENTES

5.2.2 Requirement calculations

Terrain and soil units can be evaluated in the way they meet the requirements of some croptypes. In file LE.DBF data are stored for requiring crops and non requiring crops (see Wielemaker, 1992). The degree of sufficiency is evaluated with regards to nutrients, water, oxygen, workability and erosion-risk. There are four sufficiency classes: 1. High, 2. moderately high, 3. moderate, 4. insufficient. For each aspect an indicative terrain or soil property is evaluated, oxygen availability is correlated with drainage class (SP11) whereas erosion risk is correlated with slope gradient (TP6) etc. In annex 5 the description of each criterion can be found (e.g. datafile OX-C12.DBF shows sufficiency classes and indicates the values of SP11 which determine the assignation to these classes). The INFO-program REQ.PRG can be used to execute the calculations.
A suitability classification based on these requirements is stored in items LSU-C1 (requiring crops) and LSU-C2 (non-requiring crops) of LE.DBF. The most limiting factor, or the lowest sufficiency found in the evaluated items, determines the suitability class. The calculations are automated in INFO-program SUC.PRG. Figure 5.1 shows the results of the evaluation of nutrient requirements for requiring (NU-C1) and non-requiring (NU-C2) crops. The suitability classification (LSU-C1, LSU-C2) is shown in figure 5.2.

5.3 DATA AGGREGATION

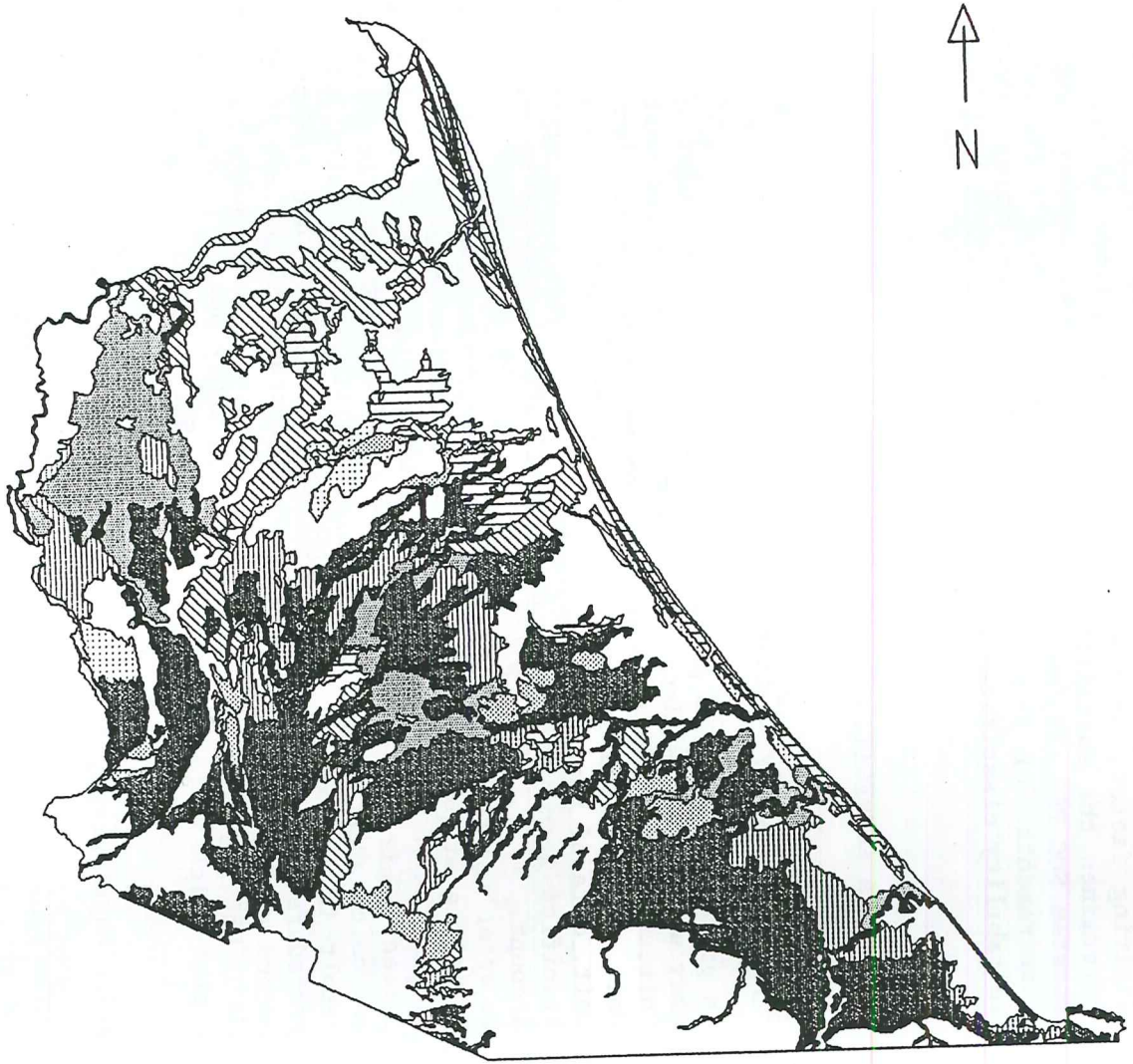
5.3.1 Suitability distribution

In preceding examples plots were created with only a part of the information, they were based on data of the dominant or the second most dominant Terrain Unit. We could say that information was given on the level of the Terrain Unit. To retrieve information on a higher level, the level of the Mapping Unit, data of the constituent Terrain Units have to be aggregated. So, for a specified item the information of all the Terrain Units must be taken into account.
To establish the suitability of the area covered by a certain Mapping Unit the following steps are made. First is evaluated which Terrain Units do occur within the Mapping Unit. Secondly is stated which suitability classes are present. Thirdly the percentages of appearance of specific suitability classes are calculated (each Terrain Unit contributes to a suitability class). The result is in fact a suitability distribution within a Mapping Unit. This procedure can be executed using the INFO-program SULUT.PRG (in the program the second and third step are usually integrated). The results are written to file SULUT.DBF. In table 5.1 a part of file SULUT.DBF is listed. Figure 5.3 shows a plot which is based on data of file SULUT.DBF.

5.3.2 Physiography distribution

The mentioned procedure can be repeated for many other attributes. For example the physiography (TP1) can vary within a Mapping Unit. Again a program is written to do the calculating work: the program TP1.PRG processes files STMU.DBF and TU.DBF and writes the results to file MUTP1.DBF.

NORTH EASTERN ATLANTIC ZONE



N

DISTRIBUTION OF AREAS SUITABLE FOR REQUIRING CROPS

- 0% OF TERRAIN QUALIFIED (243,440.1 HA; 44.8% TOTAL)
- 10% OF TERRAIN QUALIFIED (916.9 HA; 0.2% TOTAL)
- 20% OF TERRAIN QUALIFIED (44,206.1 HA; 8.1% TOTAL)
- 30% OF TERRAIN QUALIFIED (18,522.3 HA; 3.4% TOTAL)
- 40% OF TERRAIN QUALIFIED (6,295.5 HA; 1.2% TOTAL)
- 50% OF TERRAIN QUALIFIED (3,548.4 HA; 0.7% TOTAL)
- 60% OF TERRAIN QUALIFIED (14,945.2 HA; 2.8% TOTAL)
- 70% OF TERRAIN QUALIFIED (23,820.3 HA; 4.4% TOTAL)
- 80% OF TERRAIN QUALIFIED (16,171.4 HA; 3.0% TOTAL)
- 90% OF TERRAIN QUALIFIED (36,682.1 HA; 6.8% TOTAL)
- 100% OF TERRAIN QUALIFIED (134,476.1 HA; 24.8% TOTAL)

0 10 20 30 kms

FIGURE 5.3 Plot of distribution of suitability class MSC-1

5.4 DATA ASSOCIATION

5.4.1 Soil & settlement information

It might be desirable to acquire information about the soils found at the property of a certain farmer. In that case a soil map as well as a settlement map, on which the properties of farmers are indicated, is needed. These maps are provided by the coverages <ZANST> and <ZANIDA>. These coverages have to be unioned into a new coverage. The latter coverage stores new objects. Such an object can be the Mapping Units that are found in a certain field of a certain farmer. So Mapping Units or parts of Mapping Units are associated into new objects that match the area of settlements. Table 5.2 shows how information of two objects (Mapping Unit and settlement) can be combined, provided that the procedure described in § 5.3.1 is executed.

5.4.2 Land & land use information

Similar to the association of soil and settlement data, land and land use information can be retrieved. A unioned map of land (coverage <ZANST>) and land use in the area of Guacimo, Rio Jimenez and Siquirres (coverage <LUZGRS>) is available as coverage <PMULUZD>. This coverage enables for example queries about actual land use in relation to soil qualities or soil fertility. This matter is discussed in detail in Huising, 1992.

TABLE 5.1 Suitability distribution per Mapping Unit. The data is extracted from SULUT.DBF, MSC-1 = Major suitability class 1, SC-TOT is the total %.

MU-ID	MSC-1	MSC-2	MSC-3	MSC-4	MSC-5	SC-TOT
1	0	100	0	0	0	100
2	0	0	100	0	0	100
3	0	0	60	0	40	100
4	0	0	0	0	100	100
38	60	0	20	0	20	100
40	30	0	0	0	70	100
43	90	0	0	0	10	100
44	20	0	0	10	70	100

TABLE 5.2 Drainage class distribution per settlement (indicated in %)

SETTLEMENT	DRAINAGE (SP12)					
CODE	CL-0	CL-1	CL-2	CL-3	CL-4	CL-5
1	10	10	0	40	40	0
2	0	30	10	0	60	0
3	0	0	0	0	80	20
4	0	20	20	60	0	0
5	10	0	0	40	50	0

CL-0 = Very poorly drained
CL-1 = Poorly drained
CL-2 = Imperfectly drained
CL-3 = Moderately well drained
CL-4 = Well drained
CL-5 = Excessively drained

6 PROGRAMS

6.1 AML-PROGRAMS

AML stands for Arc Macro Language, it allows the use of normal ARC/INFO commands in combination with some features of structured program languages like PASCAL. Different types of loop structures, flexible variable definitions and powerful user response functions can easily be implemented in a program. The resulting program e.g. offers the user several options, depending on the selections made by the user, a complex procedure is executed. Two examples of the application of AML-programs will be discussed below. A third application, the possibility of making a shell with menus for users of SIESTA is not yet implemented and therefore left out of consideration.

6.1.1 Creation of map products

Programs can be used conveniently for making map products within ARC/PLOT. To make a plot many commands have to be entered: mapscale, mapunits, mapposition, mapextension, pageunits, textfont, textsize etc. Entering these commands manually is tedious and very time consuming. Creation of a program saves time and makes a certain plot reproducible.
Depending on the situation the user wishes to have an english or a spanish plot, a plot in color or in grey tone. These options are added easily to the program.
The plot shown in figure 6.1 is a result of the program TP1.AML, listed in annex 9. Within ARC/PLOT the program can be run with the commands: *&RUN TP1.AML* or *&R TP1*. Likewise plots are made of the geology (figure 6.2) with TP2.AML, the major suitability classes (figure 6.3) with MSCX.AML and the percentage distribution of soils suitable for requiring crops (figure 5.3) with MSC.AML.
All like programs start with documentation: the name of the program, the function of the program, the coverages that are used, the files that are used. Then follows the part 'user init', the user is allowed to select the kind of plot, english / spanish, shadetype color / grey. The part 'map draw' contains all the commands that are used to draw the plot. Variables are used which derive their value from selections made in the part 'user init'. This part may serve as an example of the procedure of visualisation of data on the screen. To get educated in making map products these parts of the programs can be studied.
In annex 9 the listing of TP234-LEG.AML is an example of how an AML-program is used to draw a complex legend on a map. This program is invoked by TP234.AML which generates a plot with information of geology and major and minor landforms.

6.1.2 Generation of coverages

Program GEN-ANNO.AML (see annex 9) shows how an AML can be used to generate a coverage. This program has to be run from the 'Arc:' prompt (*&R GEN-ANNO*). The program uses de ARC module GENERATE to create the coverage. Lines are being defined by coordinates of constituent points. On the workspace [KLAD] several of this kind of files are found (see annex 6).

NORTH EASTERN ATLANTIC ZONE

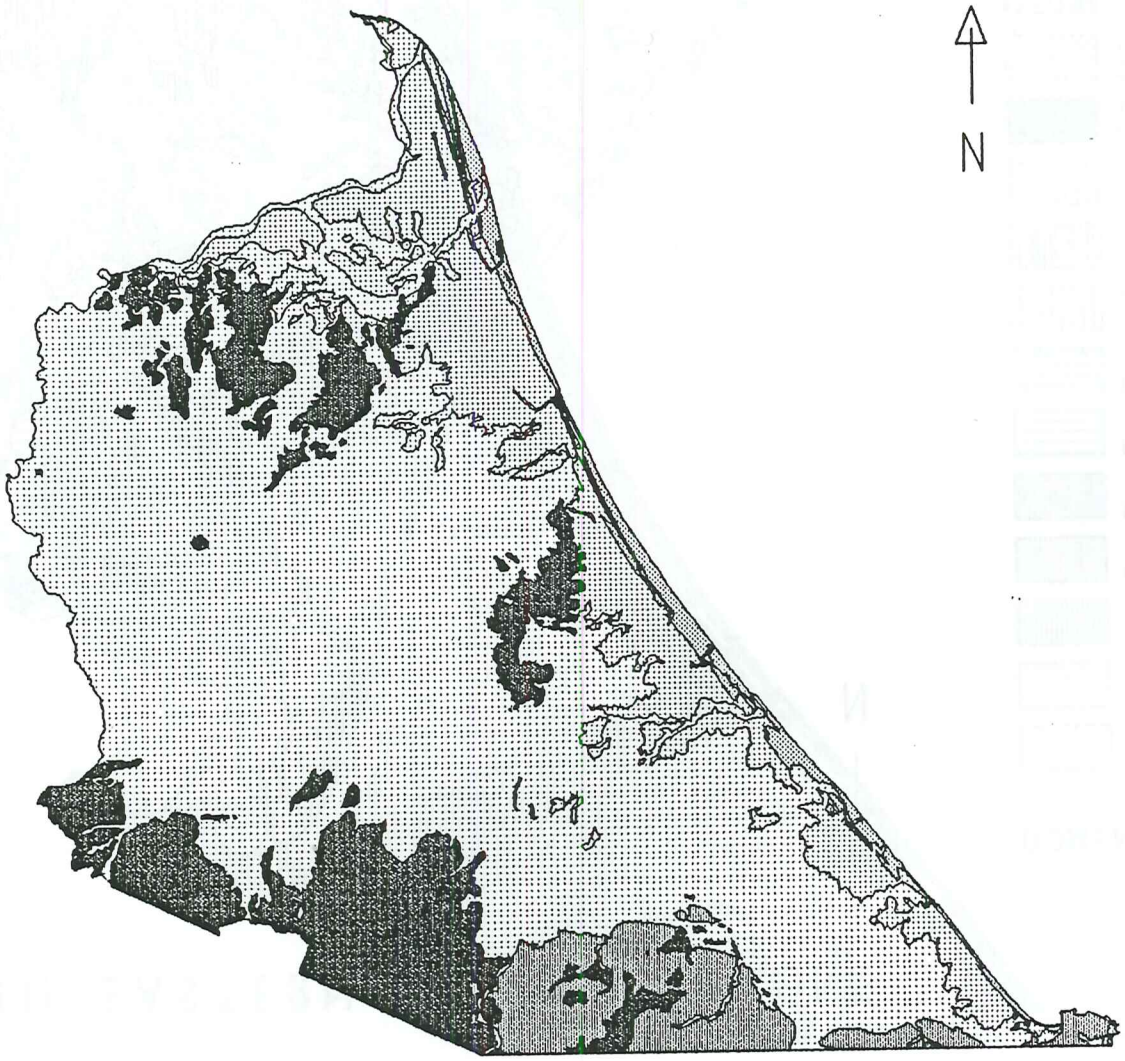
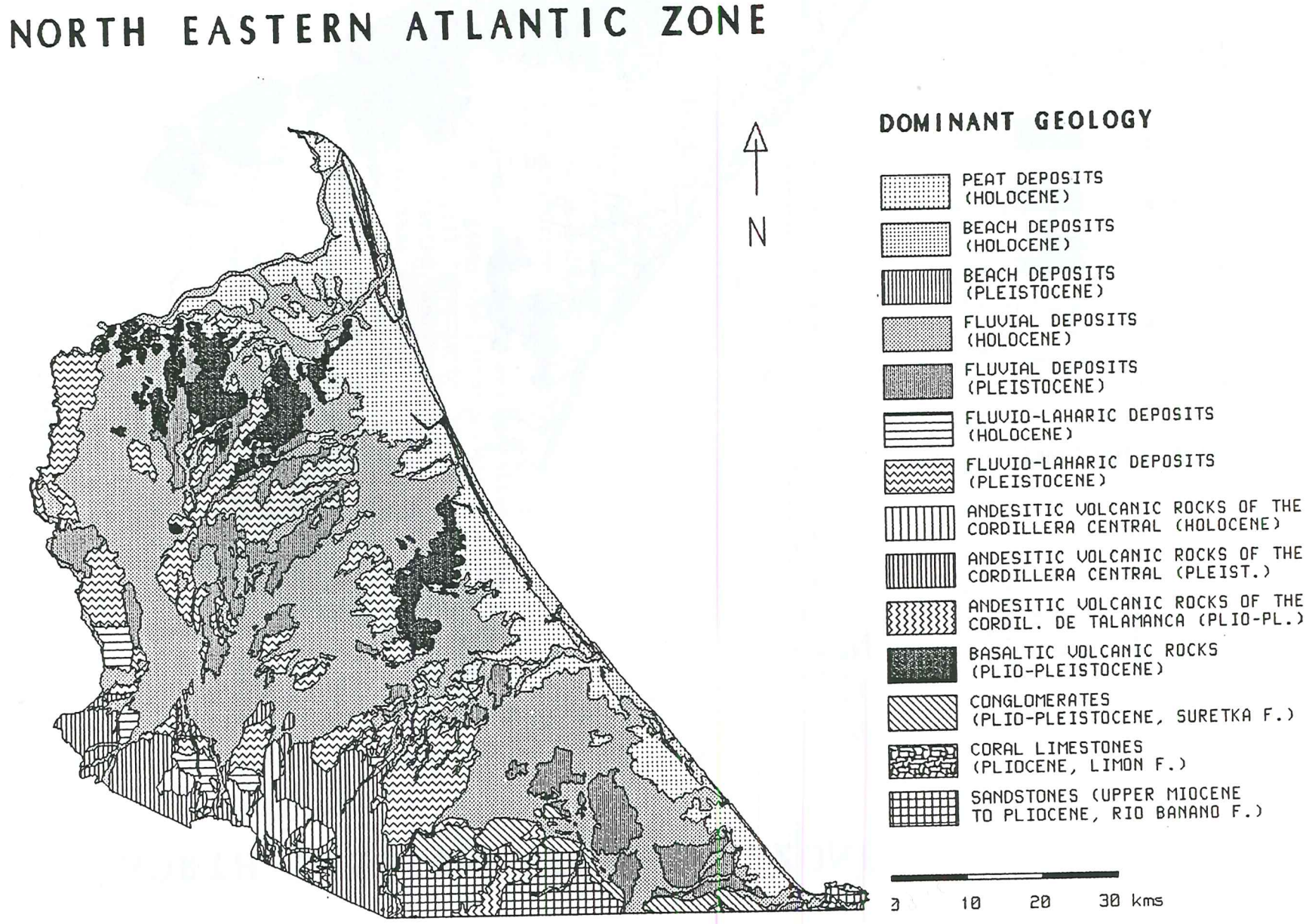
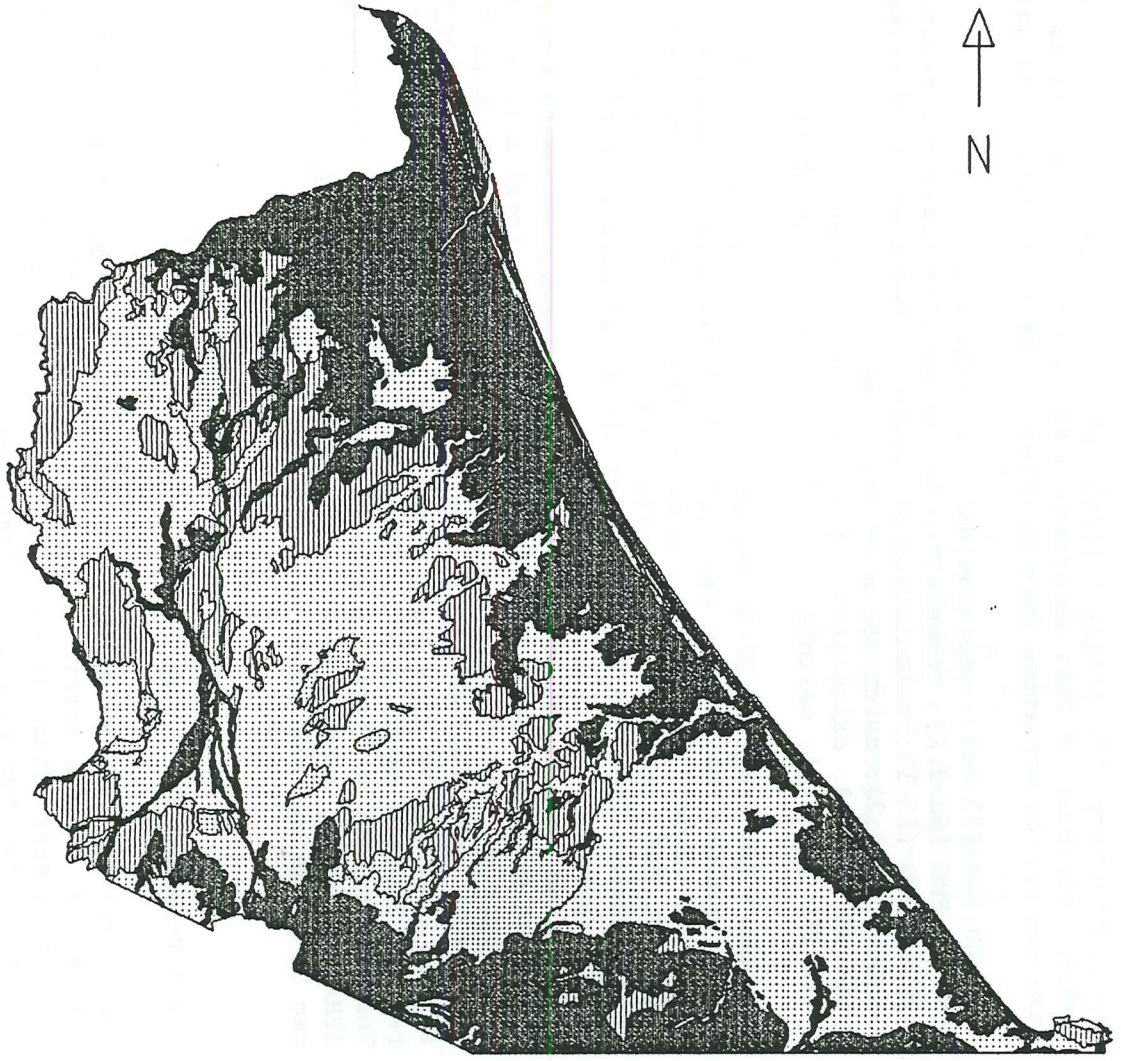


FIGURE 6.1 Plot of physiography

FIGURE 6.2 Plot of geology



NORTH EASTERN ATLANTIC ZONE



N

SUITABILITY CLASSIFICATION FOR MAJOR LAND-USE TYPES

- QUALIFIED FOR REQUIRING CROPS (224,850.4 HA; 41.4% TOTAL)
- QUALIFIED FOR MODERATELY REQUIRING CROPS (21,865.4 HA; 4.0% TOTAL)
- QUALIFIED FOR VERY LITTLE REQUIRING CROPS (63,028.1 HA; 11.6% TOTAL)
- QUALIFIED FOR STRONGLY RESTRICTED AGRICULTURAL USE (12,241.9 HA; 2.3% TOTAL)
- QUALIFIED FOR PROTECTION (217,808.7 HA; 40.1% TOTAL)

NOTE: ONLY DOMINANT TERRAIN UNIT (TU1) INDICATED ON MAP

0 10 20 30 kms

FIGURE 6.3 Plot of suitability classes (LUTSU1)

6.2 INFO-PROGRAMS

In the SIESTA environment many INFO-programs are available. Often their functioning is complex, the more is their internal structure. In order to comprehend their application an imaginary subdivision can be made in rudimentary and advanced programs and programs that can be applied as tools for data usage. Below these categories are discussed and some examples are given. All these programs have in common that they are started from the 'INFO' prompt: 'ENTER COMMAND>', with the command: *RUN <program name>*.

6.2.1 Programs for rudimentary data acquisition

The rudimentary INFO-programs facilitate the retrieval of basic information. Manual retrieval of this information is possible, however it takes a lot of time and errors may arise from it. Examples of this category of programs are:

- LUTSU.PRG (§3.3.2): calculation of suitability classes.
- SULUT.PRG (§3.3.2): calculation of suitability class distribution.
- MU-HA.PRG (§5.1): calculation of number of hectares of Mapping Units.
- REQ.PRG (§5.2): calculation of requirements.
- SUC.PRG (§5.2): calculation of suitability classes.
- TP1.PRG (§5.3.2): calculation of physiography distribution.

In annex 9 the programs TP-HA.PRG and TPHA-LST.PRG are listed. The program TP-HA.PRG enables the user to calculate the total area represented by coverage attribute values. In table 3.2 some results of these calculations are shown. File TP1.DBF stores the descriptions of the distinguished types of physiography. The item TP1-HA stores the total area covered by each type of physiography.
The program lets the user select for which Terrain Property the calculation has to be executed. Next for each Terrain Unit the total area of coverage can be calculated, the results are written to file TU-HA.DBF. File TU-HA.DBF is related to the selected descriptive file (e.g. TP1.DBF). Then for each record in the descriptive file (e.g. each type of physiography) the area of the related Terrain Units in file TU-HA.DBF is accumulated.
The results can be listed in a tabular way (like table 3.2) using the program TPHA-LST, which outputs data to screen or to textfile. Also output of results can be given via the quantitative keyfiles (§7.2).

6.2.2 Programs for advanced data acquisition

The advanced INFO-programs are characterised by their high extent of complexity. Manual retrieval of the data which they produce seems to be an impossible task. Examples are PHYS.PRG (§7.3) SMASU.PRG and ASU.PRG (see annex 9). The latter two will be discussed shortly.
The datafile SMU.DBF is a mapping unit composition table, it resembles the file STMU.DBF, but instead of TU-ID's the corresponding SU-ID's are recorded. This file is created with the purpose to be used by the program SMASU.PRG for the determination of soil associations. At the beginning of the program the content of datafile SMASU.DBF is purged. Next file SMU.DBF is scanned for combinations of soils within Mapping Units. Each combination of MU-ID, soil (ASU1) and associated soil (ASU2) is written to file SMASU.DBF as is shown in

table 6.1. In this file the items ATU1 and ATU2 record the TU-ID's corresponding with the SU-ID's stored in the ASU1 and ASU2. A certain soil association may occur in various Mapping Units. So the program ASU.PRG is used to generate the content of file ASU.DBF which stores all occurring soil associations. Table 6.2 shows that for each combination of soils is indicated where, i.e. in which Mapping Unit(s), it can be found. The program ASU-SRT offers several options to sort table ASU.DBF differently from the default sorting. To make a listing either to screen or textfile the program ASU-LST.PRG can be used. The textfile is stored in the info directory, but it can be printed or edited only outside the module INFO (give following commands at the 'Arc:' prompt: *&SYS / SET DEF [.INFO] / EDIT <filename>*).

6.2.3 Data tool applications

The third category of INFO-programs comprises programs of practical use for the presentation of data in a specific format or the execution of calculations with non-basic datafiles (e.g. ARC/PLOT supporting files). In fact these programs are tools which facilitate some database operations. Examples are: TPHA-LST (§6.2.1), ASU-LST.PRG and ASU-SRT.PRG (§6.2.2). Examples of other programs are S13-SLT.PRG which generates the content of the Symbol Lookup Table S13.SLT and W1.PRG which returns the total ha of coverage <ZANST>.

TABLE 6.1 Datafile SMASU.DBF

MU-ID	ASU1	ASU2	ATU1	ATU2
2	11	11	60	119
3	3	11	120	119
3	3	65	120	122
3	11	65	119	122
4	3	65	120	122
5	51	54	85	46
8	4	6	126	112
9	4	4	118	126
12	51	55	43	47
12	51	58	43	49
12	55	58	47	49
14	44	45	129	38
15	44	45	129	38
16	41	42	34	35
19	34	34	131	132
20	58	61	134	133
20	58	66	134	8
20	61	66	133	8
21	58	60	135	136
22	68	73	153	14
23	58	59	135	54
24	58	59	140	138

TABLE 6.2 Datafile ASU.DBF

ASU1	ASU2	MU-ID's
AGUA FRIA	COPE MALANGA	43
AGUA FRIA	LA ALDEA	79
AGUA FRIA	LOS DIAMANTES	121
AGUA FRIA	MONTELIMAR	43 80 98 99
AGUA FRIA	NEGUEV	80 121
AGUA FRIA	QUEBRADA CASPAR	79 91
AGUA FRIA	RIO FRIO	43
AGUA FRIA	SARDINA	43 80 98 99
AGUA FRIA	SILENCIO	80 98 121
BARRA	BARRO-1	52
BARRA	SILENCIO	52
BARRO-1	BARRA	52
BARRO-1	CANO BRAVA	44 72
BARRO-1	CANO MORENO	3 4 47 70
BARRO-1	CANO NEGRO	90
BARRO-1	COCORI	70
BARRO-1	FLORES-1	44
BARRO-1	NEGUEV	3 72
BARRO-1	SARDINA	44
BARRO-1	SILENCIO	52
BARRO-2	CANO MORENO	27 50 66
BARRO-2	CANO NEGRO	50
BARRO-2	COPE MALANGA	20 38 97 139
BARRO-2	LIQUIDO	27 66
BARRO-2	NEGUEV	96 134 173
BARRO-2	PERLA	20
BARRO-2	SARDINA	50 97
BARRO-2	SILENCIO	38 96 139 173
BONILLA ARRIBA	LA ROCA	16
BOSQUE	COPE MALANGA	12 45 49 53
BOSQUE	DESTIERRO	5
BOSQUE	FLORES-1	95 124
BOSQUE	LA LUCHA	89 124 137
BOSQUE	LIGIA	94
BOSQUE	MONTELIMAR	65 94 124
BOSQUE	NEGUEV	49 53
BOSQUE	RIO FRIO	83 94
BOSQUE	RIO PARISMINA	140
BOSQUE	SARDINA	12 45 49 53 65 95
CANO BRAVA	BARRO-1	44 72
CANO BRAVA	FLORES-1	44
CANO BRAVA	NEGUEV	72
CANO BRAVA	SARDINA	44

7 LEGENDS

7.1 QUALITATIVE LEGENDS

Map products usually are accompanied with legends. The kind of information provided by a legend varies strongly and dependent on the purpose of the map. A division in three types can be made: the qualitative type, the quantitative type and the dynamically structured type. The qualitative legend is the most simple type, it only labels objects on the map in the sense of *'what is found where?'*. Examples are the legend with (1) physiographic classes (figure 6.1) and (2) suitability classes (figures 3.5, 5,1). So the information that can be derived from the physiographic map (figure 6.1) is e.g. the location of volcanic areas.
Within ARC/INFO this kind of legend is made manually very easily. A keyfile can be created with a texteditor by typing the legend classes (in case of the suitability classes). Another possibility is to make a listing to file of the descriptive files found in annex 5, the new file can be edited easily into the format of the keyfile. In the case of a physiographic legend the following command sequence would result in a keyfile:

```
1-      Arc: W [COSTA.COS.ZAN]
2-      Arc: INFO
3-      ENTER USERNAME: ARC
4-      ENTER COMMAND: SEL TP1.DBF
5-      ENTER COMMAND: OUTPUT TEST.KEY
6-      ENTER COMMAND: LIST PRINT
7-      ENTER COMMAND: Q STOP
8-      Arc: &SYS
9-      vms: EDIT [COSTA.COS.ZAN.INFO]TEST.KEY
10-     vms: COPY [COSTA.COS.ZAN.INFO]TEST.KEY TP1.KEY
11-     vms: DELETE [COSTA.COS.ZAN.INFO]TEST.KEY.*
12-     vms: Q
13-     Arc:
```

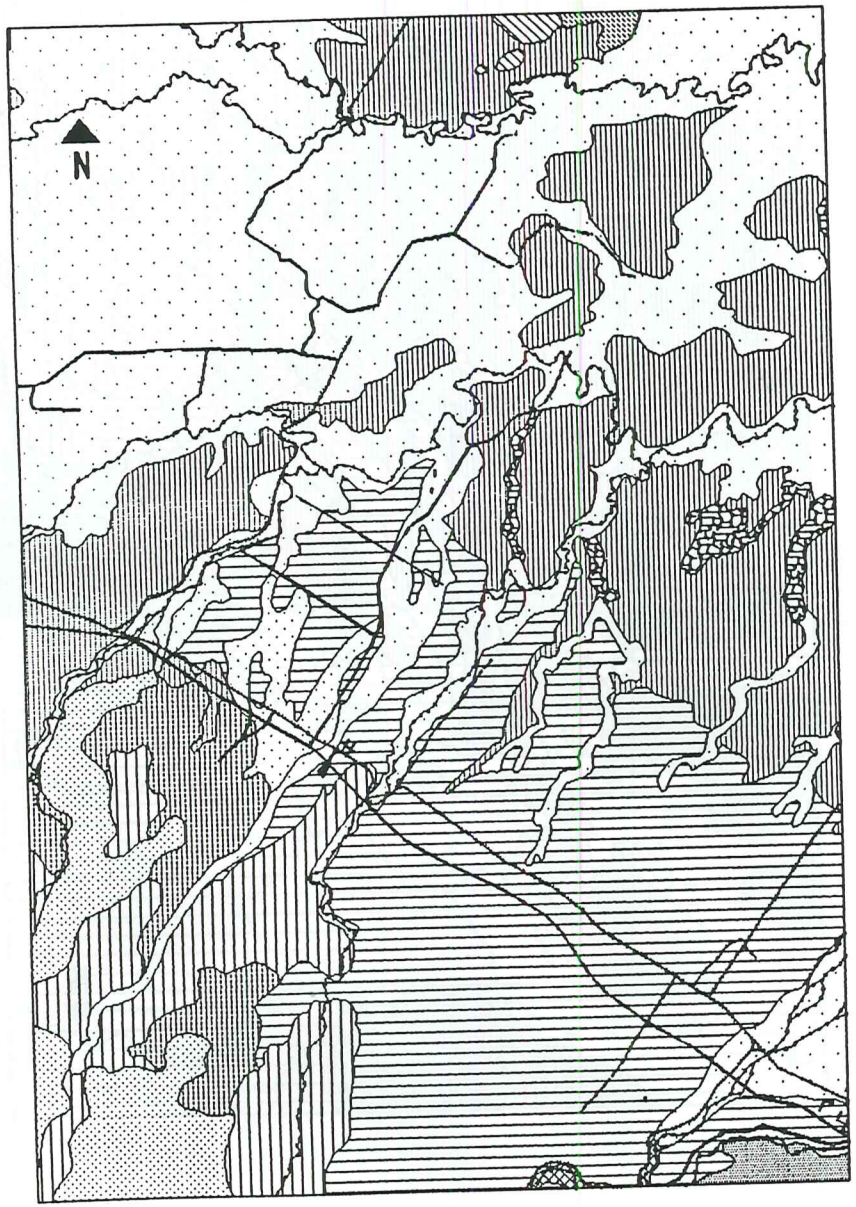
Explanation of commands:
1- Go to the correct workspace.
2- Start INFO session.
4- Select descriptive file TP1.DBF.
5- Make that all output that will be sent to printer will instead be recorded in the file TEST.KEY.
6- Send a listing file TP1.DBF to printer (so that the listing of TP1.DBF is stored in file TEST.KEY).
7- Quit the INFO session.
8- Make a temporary exit to the vms operating system.
9- Edit file TEST.KEY into the right format of a keyfile.
10- Copy the file from the (vms-)INFO directory to the workspace, give it a new name as well.
11- Delete all versions of the old file.
12- Return to ARC/INFO.
13- Operation executed.

7.2 QUANTITATIVE LEGENDS

Legends that do not only label the objects on the map but also give additional information about the objects can be considered as quantitative legends. They are characterised by the question: *'how much of what is found where?'*. Some examples are the legend with (1) mayor suitability classes (figure 6.3) and (2) distribution of suitable soils (figure 5.3).
This kind of legend demonstrates the advantages of data storage in a GIS like ARC/INFO. With little effort accurate information can be presented concerning e.g. the area that is covered by objects, or the percentage of coverage of an object within a certain study area.
Keyfiles of this kind are best generated with the use of an INFO-program which searches the databases and extracts the desired information and puts in the correct keyfile format. These programs are preferable to manual keyfile generation for they save time and, in case of geometric or thematic adjustments of the coverage, the new keyfile is easily reproduced.
The program MSCX-KEY.PRG generates a keyfile for a plot of the major suitability classes based on coverage <ZANST> (figure 5.3). The program allows to select the creation of either a spanish or an english keyfile. Next the area and the percentage of the total area of the suitability classes are calculated. The results are written to a textfile which receives the text in the correct keyfile format.

7.3 DYNAMIC LEGEND STRUCTURING

Totally different from the former described procedures of legend generation is the option offered by SIESTA to construct legends in a dynamic way. Dynamic legend structuring can be defined as the ability to organise the hierarchical structure of key attributes, which constitute the legend, in any desired order.
Figure 7.1 shows a plot with a legend based on two key attributes, the first key attribute (also named attribute of the first key level) is the soil fertility, the second key attribute (the attribute of the second key level) is the lithology. So the plot shows which types of lithology can be found within the soil fertility classes. Figure 7.2 is based on the same key attributes, however they are differently ordered. The first key attribute is the lithology and the second key attribute is the soil fertility. This plot shows the soil fertility within the lithologic classes. It should be noticed that the items (e.g. 'fertile soils', 'fluvial deposits', 'peat deposits') of both legends are the same but they are arranged in a different order. As a result these maps appear to be different although they contain the same information. So by means of a reordering of the key attributes, different accents can be given with the same information in a very simple way.
These matters are best illustrated with an example of the construction of a physiographic legend. The program PHYS.PRG (annex 9) is used to generate this legend type. Within SIESTA a physiographic legend can be constructed with the following Terrain Properties TP1 - physiography, TP2 - geology, TP3 - major landform, TP4 - minor landform, TP5 - parent material; the geology is subdivided in GP1 - lithostratigraphic units, GP2 - epoch (in the program also called period). These Terrain Properties can be considered as the key attributes of the legend. The program allows the user to select Terrain Properties in a desired order of importance. Several other questions have to



NEGUEV AREA

LITHOLOGY FOR SOIL FERTILITY CLASSES

LEGEND

FERTILE SOILS
- FLUVIAL DEPOSITS
- FLUVIO-LAHARIC DEPOSITS
- ANDESITIC VOLCANIC ROCKS

MODERATELY FERTILE SOILS
- FLUVIO-LAHARIC DEPOSITS
- ANDESITIC VOLCANIC ROCKS
- BASALTIC VOLCANIC ROCKS

NOT FERTILE SOILS (ACID)
- FLUVIO-LAHARIC DEPOSITS
- ANDESITIC VOLCANIC ROCKS
- BASALTIC VOLCANIC ROCKS
- CONGLOMERATES

VERY SHALLOW OR VERY POORLY DRAINED SOILS
- PEAT DEPOSITS
- FLUVIAL DEPOSITS

0 2 4 6 kms

FIGURE 7.1 Plot of lithology within soil fertility classes

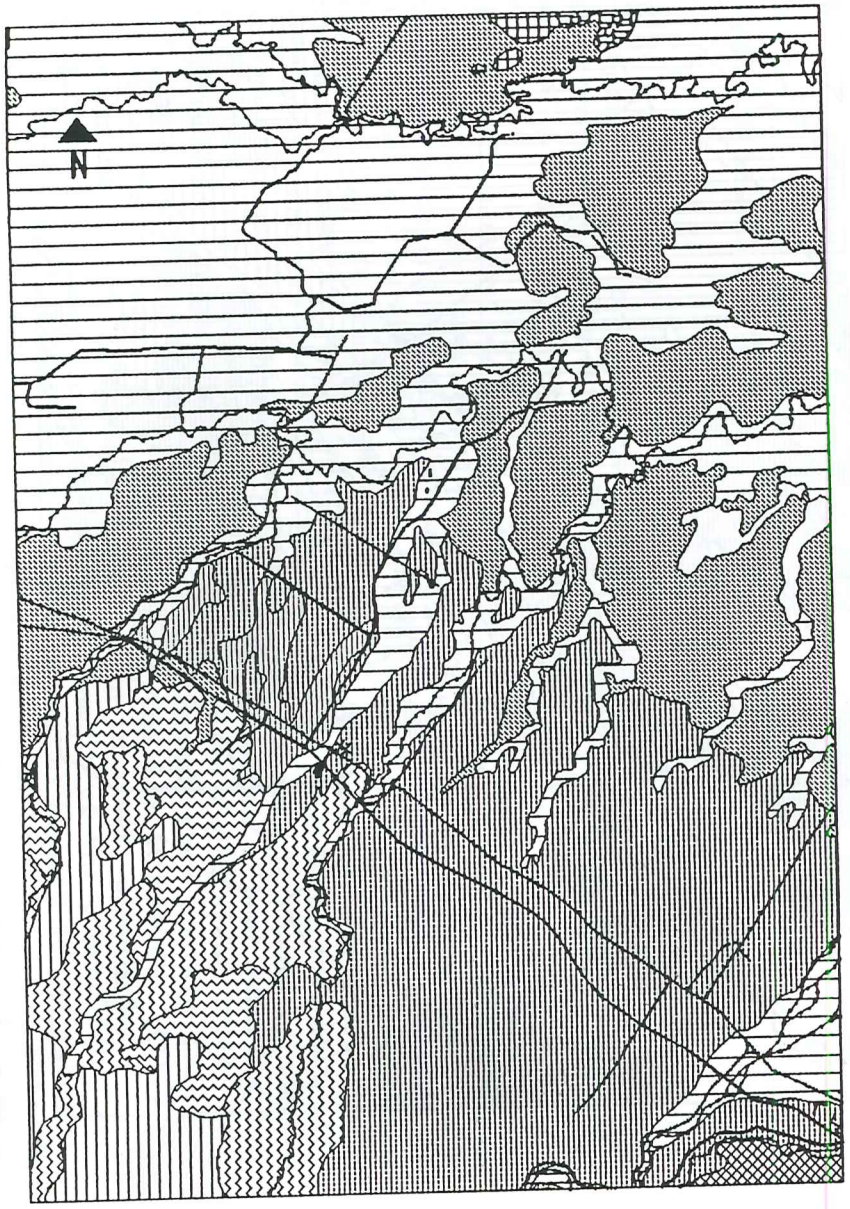


FIGURE 7.2 Plot of fertility within lithology classes

be answered as well. The result is a legend that is listed to screen or to a textfile. Below is shown how the program can be run, the total communication of the program is displayed, the input of the user is indicated with bold characters.

```
1-      ENTER COMMAND: RUN PHYS.PRG

              .....PHYS-LEG KEYFILE GENERATION .....
              PROGRAM TO GENERATE KEY-FILE FOR PHYSIOGRAPHIC MAP.
              ENTER NUMBER TO SELECT TERRAIN PROPERTIES.  ENTER 0
              TO END SELECTION.

                1) TP1 PHYSIOGRAPHY'
                2) GP1 GEOLOGY
                3) GP2 PERIOD
                4) TP3 MAJOR LANDFORM
                5) TP4 MINOR LANDFORM
                6) TP5 PARENT MATERIAL

2-            ENTER PROPERTY OF FIRST LEVEL:.....1

3-            ENTER PROPERTY OF SECOND LEVEL:....4

4-            ENTER PROPERTY OF THIRD LEVEL:.....5

5-            ENTER PROPERTY OF FOURTH LEVEL:....0

              TWO TYPES OF KEYFILES CAN BE GENERATED :

                1) ENGLISH KEYFILE
                2) SPANISH KEYFILE

6-            PLEASE ENTER NUMBER TO SELECT: 1

              OUTPUT OF GENERATED KEYFILE IN TWO WAYS:

                1) KEYFILE LISTED TO SCREEN
                2) KEYFILE WRITTEN TO FILE

7-            PLEASE ENTER NUMBER TO SELECT: 2

              OPTION TO ADD SOILNAMES TO THE KEYFILE:

                1) KEYFILE WITH PHYSIOGRAPHIC LEVELS AND SOILNAMES
                2) KEYFILE WITH PHYSIOGRAPHIC LEVELS ONLY

8-            PLEASE ENTER NUMBER TO SELECT: 2

              OPTION TO SELECT A SUBSET OF TERRAIN UNITS
              ANSWER QUESTIONS OR  ELSE GIVE <RETURN> TO CONTINUE
              ..................................................
9-            ENTER FILENAME:.................GCM.PAT
10-           ENTER RELATE ITEM:..............TU1-ID

              Writing key attributes to keyfile.................

              ..................................................
              ..................................................
              ..................................................
              ..................................................
              ..................................................
              ....PROGRAM READY - KEYFILE WRITTEN TO PHYS.KEY....

11-     ENTER COMMAND: SYS
12-     $ EDIT PHYS.KEY
13-     $ COPY PHYS.KEY TP134.KEY
14-     $ DELETE PHYS.KEY.*
15-     $ LO
16-     ENTER COMMAND:
```

Explanation of commands:
1- Start the program.
2- Physiography (TP1) is selected as first keylevel.
3- Major landform (TP3) is selected as second keylevel.
4- Minor landform (TP4) is selected as third keylevel.
5- Selection of key attributes is ended.
6- Selection of an english legend / keyfile.
7- The resulting keyfile will be stored in a textfile.
8- No soilnames will be added to the legend. If the option with soilnames is selected then for each legend unit all the soils that do occur within that legend unit will be listed.
9- The file GCM.PAT is used to select a subset of Terrain Units. If the option is skipped (give <RETURN> at question 9- and 10-) then all Terrain Units that are described in file TU.DBF will be considered. The produced keyfile contains all possible combinations regarding the selected terrain properties.
10- The legend is based on the information of the dominant Terrain Unit (TU1), other options in case of file GCM.PAT are TU2-ID,TU3-ID,TU4-ID,TU5-ID. If question 9- is left blank only then this question can be left blank, so give a <RETURN>.
11- The program is ready, make a temporary exit to the vms operating system.
12- The generated keyfile can be viewed or edited using the edit command.
13- The keyfile is copied to a new file.
14- The old version of PHYS.KEY is deleted in order to avoid confusion after running the program PHYS.PRG another time. Because, if file PHYS.KEY isn't present on the directory then a new file is created. If there is a file PHYS.KEY present then the output of the program will be joined with the existing file. As a result file PHYS.KEY stores more then one keyfile.
15- Return to info using the command LOGOUT.
16- Operation executed.

The results of running PHYS.PRG as described above are partially shown in figures 7.3 and 7.4. In figure 7.3 is shown how table TU.DBF is sorted on respectively TP1, TP3 and TP4. The records of file TU.DBF are scanned from the top. Each time when there is a difference between the present and the former record, a new item is added to the legend. So finally all different combinations of codes of TP1, TP2 and TP3 are displayed in legend items. The keyfile that is generated from the part of table TU.DBF (figure 7.3) is shown in figure 7.4.
The keyfile produced by the program is not yet ready to be used within ARC/PLOT to produce a smooth legend on a map. Due to ARC/INFO's restricted possibilities with regard to presentation of legends on maps, manual adjustments are necessary. However, the structure of the legend is available. A significant advantage of the dynamic legend structuring is the possibility to change the total number of key levels in the legend. Thematically identical legends with different complexity can be composed easily. For instance two different physiographic legends can be generated. The first one has four key levels and is based on the Terrain Properties TP1, TP3, TP4 and TP5. The second one has two key levels representing the Terrain Properties TP1 and TP3. Figure 7.5 shows that the latter legend has few legend items, on the contrary the first legend is relatively complex (see figure 7.6). The complex legend can be used for a large scale map, giving detailed information for a relatively small area. Whereas the simple legend can be used for a small scale map which is less suitable for display of detailed information.

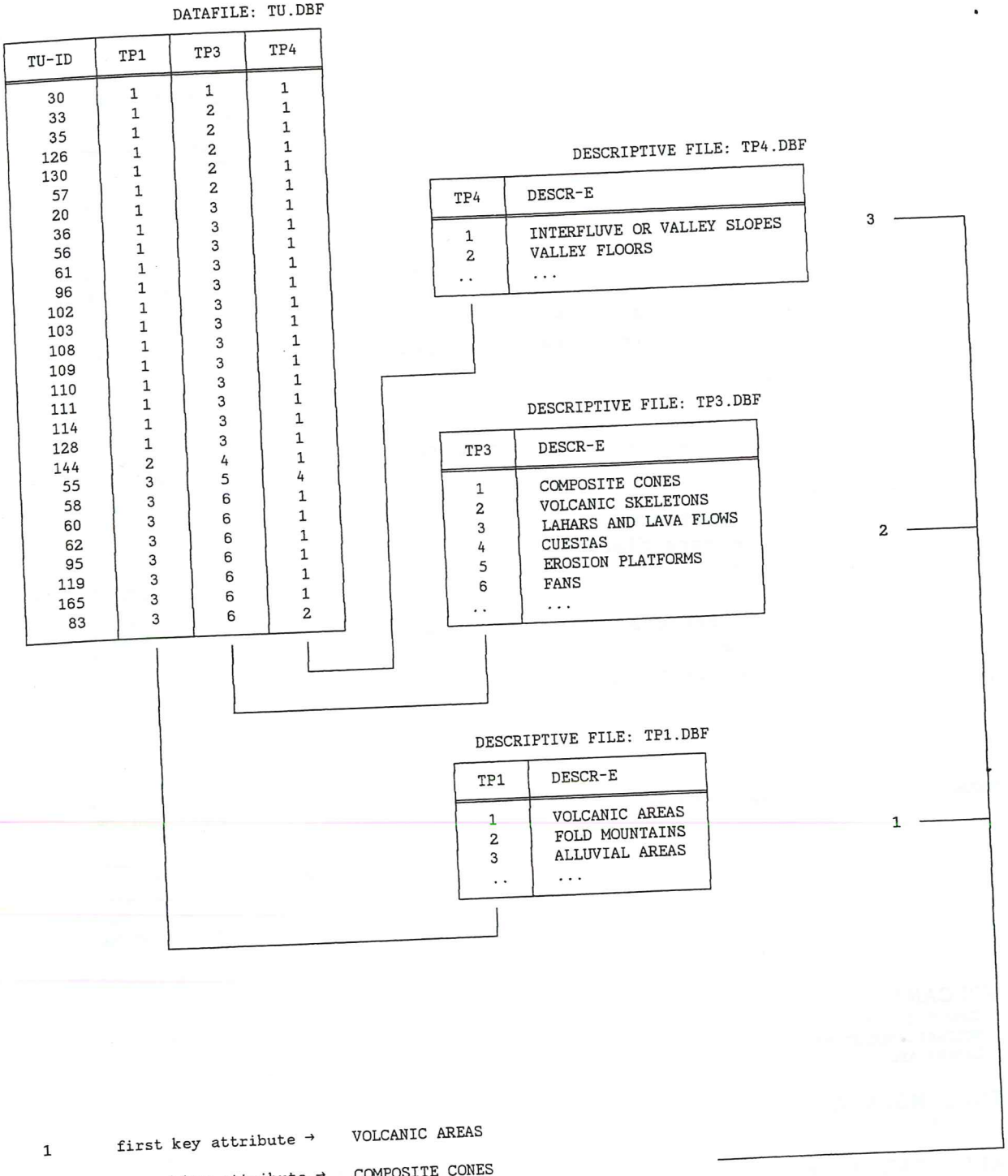


FIGURE 7.3 Scheme of file relates used with dynamic legend generation

VOLCANIC AREAS
composite cones
interfluve or valley slopes
.30
volcanic skeletons
interfluve or valley slopes
.57
lahars and lava flows
interfluve or valley slopes
.20
FOLD MOUNTAINS
cuestas
interfluve or valley slopes
.144
ALLUVIAL AREAS
erosion platforms
terrace flats
.55
fans
interfluve or valley slopes
.58
valley floors
.83

FIGURE 7.4 Physiographic keyfile

VOLCANIC AREAS
COMPOSITE CONES
VOLCANIC SKELETONS
LAHARS AND LAVA FLOWS

FOLD-MOUNTAINS
CUESTAS

ALLUVIAL AREAS
EROSION PLATFORMS
FANS
FLOODPLAINS

MOORLANDS
BOGS

FIGURE 7.5 Legend based on TP1 and TP3

- **VOLCANIC AREAS**
  - COMPOSITE CONES
    - INTERFLUVE OR VALLEY SLOPES
      - VOLCANIC ASH OVER LAVA
      - LAVA AND VOLCANIC ASH
      - LAVA
  - VOLCANIC SKELETONS
    - INTERFLUVE OR VALLEY SLOPES
      - LAVA
  - LAHARS AND LAVA FLOWS
    - INTERFLUVE OR VALLEY SLOPES
      - VOLCANIC ASH OVER LAVA
      - BRECCIATED LAVA
      - LAVA
      - SAPROLITIC LAVA
      - DESINTERGRATED LAVA
      - CEMENTED BRECCIATED LAVA OR LAHAR
- **FOLD-MOUNTAINS**
  - CUESTAS
    - INTERFLUVE OR VALLEY SLOPES
      - BRECCIATED LAVA
- **ALLUVIAL AREAS**
  - EROSION PLATFORMS
    - TERRACE FLATS
      - SILT AND CLAY OF VARIABLE ORIGIN
  - FANS
    - INTERFLUVE OR VALLEY SLOPES
      - STONY LAHAR
      - SANDY LAHAR
    - VALLEY FLOORS
      - STONY SAND OF VOLCANIC ORIGIN
    - INTERFLUVE FLATS
      - BOULDERY LAHAR
      - STONY LAHAR
      - SANDY LAHAR
      - BOULDERY SAND OF VOLCANIC ORIGIN
      - STONY SAND OF VOLCANIC ORIGIN
      - SAND OF VOLCANIC ORIGIN
    - ABANDONED CHANNELS
      - STONY SAND OF VOLCANIC ORIGIN
  - FLOODPLAINS
    - VALLEY FLOORS
      - STONY SAND OF VOLCANIC ORIGIN
    - CREVASSE SPLAYS
      - SAND OF VOLCANIC ORIGIN
      - FINE SAND AND SILT OF VOLCANIC ORIGIN
    - FLOOD BASINS
      - SILT AND CLAY OF VOLCANIC ORIGIN
    - NATURAL LEVEES
      - FINE SAND AND SILT OF VOLCANIC ORIGIN
      - FINE SAND AND SILT OF VARIABLE ORIGIN
- **MOORLANDS**
  - BOGS
    - FLOOD-BASIN BOGS
      - EUTROPHIC PEAT
    - VALLEY BOGS
      - EUTROPHIC PEAT

FIGURE 7.6 Legend based on TP1, TP3, TP4 en TP5

8 MANAGEMENT OF COVERAGES AND DATABASES

8.1 FILE MAINTENANCE

To ensure correct information supply by SIESTA, the datafiles always must be in a proper state. First, they must have the correct format. Second, they must be sorted in the appropriate order. Third the information stored in the files must be up to date.
In figures 3.2 and 3.3 is illustrated how the format of datafiles can be defined. Changes of the file format are for instance: changes of the definitions of items, elimination of alternate names, alteration of redefined items. Possible consequences of these changes are: data of a certain file will be purged, some files can't be related, bailing out of some INFO-programs. If changes are made, it must be done carefully and properly, considering which programs and ARC/PLOT procedures may be affected. Afterwards some programs may have to be altered and former methods of making certain map products may have to be changed also.
Within the ARC/PLOT module relates can be established in order to extract information. In case of incorrect ordering of the involved files query results are unpredictable. In table 8.1 is indicated which files must be sorted on a specific item. Notice that all each pat-file must be sorted on the internal number (e.g. ZANST.PAT must be sorted on item ZANST#). Changes of file sorting have two possible causes. First, while working within the INFO-module a datafile is selected and the sorting of the file is changed with the command: *SORT ON <item name>*. Second, a certain INFO-program is used which has changed the ordering of a specific file [1]. The sorting of the primary datafiles should be checked after use of the following programs: ASU.PRG, ASU-SRT.PRG, PHASU.PRG, PHYS.PRG, PHYS-SLT.PRG, LEG.PRG.
It may be desired to change polygons of a coverage or datafiles related to that coverage. As a consequence other data need to be updated. In table 8.2 is shown which files are affected by the performance of a certain change operation. Further is indicated how the data must be updated, i.e. which items must be recalculated or which programs should be run.

8.2 COVERAGE EXTENSION

The Soil and land information stored in coverage <ZANST> can be combined with e.g. land use information (see §5.4.2). The overlay operation, executed with the command *UNION*, combines all polygons of both coverages and produces a relatively large amount of new polygons. Therefore the newly created coverage should be considered as a temporary coverage. So that after data retrieval this coverage can be killed.
Photo overlays containing new Mapping Units can be added to existent coverage. The overlays have to be digitized, geometrically transformed and joined to a certain coverage. For the outline how to perform this comprehensive procedure is referred to Stuiver (in press).

---

[1] Several INFO-programs change the sortation of a datafile and do not restore the previous situation. The purpose is that after the program is finished further manual query of the datafile in a desired ordering (i.e. sorted by the program) is possible. However the disadvantage is that the user may forget to order the datafile correctly after the use of the program.

TABLE 8.1 Sort items of datafiles

DATAFILE	SORT ITEM
LE.DBF	TU-ID
MUTP1.DBF	MU-ID
SMU.DBF	MU-ID
STMU.DBF	MU-ID
SU.DBF	SU-ID
TU.DBF	TU-ID
ZANST.PAT	ZANST#

TABLE 8.2 Table of change operations and involved datafiles

DATAFILE	A	B	C	D	E	F	G	H	I	J
ZANST.PAT	-	-	-	-	-	-	-	12	12	12
STMU.DBF	-	-	1	1	-	-	-	1	1	-
TU.DBF	-	1	-	-	1	1	1	-	1	-
SU.DBF	1	-	-	-	8	1	-	-	1	-
LE.DBF	2	2	-	-	2	2	2	2	2	-
LUTSU.DBF	2	2	-	-	2	2	2	2	2	-
REQ.DBF	2	2	-	-	2	2	2	2	2	-
ASU.DBF	-	-	-	10	10	10	10	10	10	-
ASU-LST.DBF	-	-	-	10	10	10	10	10	10	-
PHASU.DBF	-	9	-	9	9	9	9	9	9	-
SMASU.DBF	-	9	-	9	9	9	9	9	9	-
SMU.DBF	-	-	-	11	11	11	11	11	11	-
SULUT.DBF	3	3	3	3	3	3	3	3	3	-
MUTP1.DBF	-	4	4	4	-	-	4	4	4	4
TU-HA.DBF	-	-	7	7	-	-	7	7	7	7
TP?.DBF	-	6	6	6	-	-	6	6	6	6
GP?..DBF	-	6	6	6	-	-	6	6	6	6
SP?.DBF	5	-	5	5	5	5	5	6	6	6
PHYS-CODE.DBF	-	-	-	-	-	-	13	-	13	-

EXPLANATION:

KIND OF CHANGE OPERATION:

A. Change of values of items SP1...SP13 of file SU.DBF
B. Change of values of items TP1...TP9 of file TU.DBF
C. Change of Mapping Unit composition: percentage distribution (items TU1-PC...TU5-PC)
D. Change of Mapping Unit composition: Terrain Unit codes (items TU1-ID...TU5-ID)
E. Change of values of item TP10 of file TU.DBF
F. Deletion of SU-ID
G. Deletion of TU-ID
H. Addition of new MU-ID
I. Addition of new MU-ID, with definition of new TU-ID's and SU-ID's
J. Change within ARC/EDIT: adjustment of shape of several polygons

NECESSARY DATA ADJUSTMENTS:

1. Execute desired changes
2. Recalculate landevaluation data, run LUTSU.PRG / REQ.PRG / SUC.PRG
3. Recalculate distribution of suitability classes from items LUTSU1,LUTSU2 run SULUT.PRG
4 Recalculate distribution of physiography classes, run TP1.PRG
5. Recalculate hectares in descriptive files SP1.DBF...SP13.DBF
6. Recalculate hectares in descriptive files TP1.DBF...TP9.DBF,GP1.DBF,GP2.DBF and SU.DBF, run TP-HA.PRG
7. Recalculate hectares in file TU-HA.DBF, run TU-HA.PRG
8. Recalculate hectares in file SU.DBF, run TP-HA.PRG
9. Determine soil phases, run PHASU.PRG / SMASU.PRG
10. Determine soil associations, run SMASU.PRG / ASU.PRG
11. Recalculate content of file SMU.DBF, run SMU.PRG
12. Coverage has been cleaned, join new PAT-file with new STMU.DBF
13. Calculate new physiographic codes, run PHYS-CODE.PRG

8.3 REVISION HISTORY

The use of antiquated maps and databases must be avoided. Therefore each update needs to be documented and maps and databases should receive a new version number. Figure 8.1 shows the documents ZANSTHIS.TXT which records the modifications of coverage <ZANST> and SIESTA datafiles.

```
REVISION HISTORY OF COVERAGE <ZANST>
_____________________________________________________________

Date: ../../..
Revised by: (name of revisors / editors) .........................
Description of revision
* ARC\EDIT: (change of polygons and labels) .....................
* ID-EDIT: (change of ZANST-ID in PAT-file) .....................
* SU.DBF: (change of soil property) (change of soil-id) .........
* TU.DBF: (change of terrain property) (change of tu-id) ........
* STMU.DBF: (change of tu-id or tu-pc) (change of mu-id) ........
* LE.DBF: (change of number of items) (change of item-values) ....
New version number: ...
_____________________________________________________________


_____________________________________________________________

Date: 01/01/1991  Version number is set to 0.1
_____________________________________________________________


_____________________________________________________________

Date: 21/10/1991
Revised by: W.G. Wielemaker / W.K. Krabbe
Description of revision
* ARC\EDIT:  -
* ID-EDIT:   -
* SU.DBF:
1) SU-ID 49, SU-NM = Dos Novillos variante fluvio laharico is replaced
   by soiltype Montelimar (SU-ID = 47). Therefore  SU-ID 49 is deleted
   in the SU.DBF, and TU-ID 41 is deleted in the TU.DBF. In the  STMU.
   DBF TU-ID 41 is replaced by TU-ID 40 (corresponding to Montelimar).
   TU 41 did only appear in mapping unit 131 for 100%.  For MU 131 the
   item TU1-ID is changed to 40.
2) SU-ID 56, SU-NM = Rio Parismina.
   SP11 code 3 is replaced by 4 (so LUTSU2 changed from 12 to 11).
3) SU-ID 59, SU-NM = Zent.
   SP11 code 1 is replaced by 2 (so LUTSU2 changed from 42 to 11).
* TU.DBF:
1) TU-ID 55, SU-NM = Ligia.
   TP3 code 7 is replaced by 5. TP4 code 8 is replaced by 4.
2) TU_ID 38, SU-NM = Guayabo.
   TP6 code 3 is replaced by 2 (so LUTSU2 changed from 14 to 12).
3) TU-ID 15,102,103, SU-NM = Rio Roca.
   TP9 code 3 is replaced by 4 (so LUTSU2 changed from 12 to 11).
4) TU-ID 137, SU-NM = Matas de Costa Rica.
   TP8 code 3 is replaced by 4 (so LUTSU2 changed from 11 to 13).
-) TU-ID 41 deleted (caused by change of SU-ID 41).
* STMU.DBF:
-) MU-ID 131, TU1-ID = 41, TU1-PC = 100,
   TU1 code 41 is replaced by 40 (caused by change of SU-ID 41).
* LE.DBF:  -
New version number: 1.0
_____________________________________________________________
```

FIGURE 8.1 Revision history of coverage <ZANST> and SIESTA datafiles

9 REMARKS

* lookup tables

A lookup table (see §4.1) needs to be sorted on the item SYMBOL in order to be used by ARC/PLOT. However it appeared to be that symbol lookup tables to which new records are added and that are subsequently sorted correctly give rise to errors within ARC/PLOT. Therefore symbol lookup tables can best be generated in a correct symbol code order.

* numeric values

In several datafiles character items are used to store numeric values. If the item has a width of two characters and the recorded values are lower than 10, then problems may rise. For example the item value number '1' can be stored in two ways: either on the first position of the field '1 ', or on the second position of the field ' 1'. In the first case the field stores a numeric value '10', in the second case a numeric value '1' is stored. Errors may occur if items with erroneously stored values are used by INFO-programs or file relates.

* terminals and displays

The SIESTA datafiles are stored on a MICRO/VAX to which Tektronix Terminals as well as VAX Workstations are connected. Within ARC/INFO a terminal device and a display device (on which a map can be plotted) have to be defined. While working on the Tektronix terminal following commands have to be entered: *&TERMINAL 4208 / DISPLAY 4208*. On a VAX Workstation only one of the following commands has to be entered: *DISPLAY 9999, DISPLAY 9999 3, DISPLAY 9999 2, DISPLAY 9999 1* (the different commands determine the size of the display). To make plots on paper a Tektronix ink plotter is used. The color definitions of the plotter correspond with those of the Tektronix terminals. So the colors on the screen are the same as the colors on the paper. But if on a VAX Workstation e.g. the program MSCX.AML is run, the plot is made with the wrong colors. This is caused by a difference of color definitions. Shadesets are based on the color definitions of the shadeset TEKPAT which is present on the system. The workstation and the tektronix interpret the shadeset differently. Therefore to make correct plots on a workstation the following command has to be given within ARC/PLOT: *SETTEKCOL*.

REFERENCES

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Oosterom, A.P., H.J Stuiver, W.K. Krabbe and R.M. Hootsmans, 1992. Geographical information techniques and photogrammetry used in soil and landscape inventories of the Atlantic Zone in Costa Rica. p. 31-36. In W.G. Wielemaker and S.B. Kroonenberg (ed.) Generación y Aplicación de la información de Suelos de la Zona Atlántica de Costa Rica. Actas del taller información de suelos. Guápiles 2-4 Oct. 1990 Serie Téchnica, informe ténico no 170. Programma Paper no 13. Atlantic Zone programme CATIE-UAW-MAG. CATIE, Turrialba, Costa Rica.

Wielemaker, W.G.and A.W. Vogel, (eds.), 1993. Un sistema de informacion de suelos y tierras para la Zona Atlántica de Costa Rica. Report no 22, Atlantic Zone Programme, CATIE-UAW-MAG, CATIE, Turrialba, Costa Rica.

ANNEX 1 LIST OF COVERAGES

[ZAN]

. ZANADM: administrative boundaries of North East. Atl. Zone
. ZANIDA: location of IDA-settlements in North East. Atl. Zone
. ZANLUZ: land use zone map of North East. Atl. Zone
. ZANRR: clip of topographic map of North East. Atl. Zone
. ZANST: soil an landunit map of North Eats. Atl. Zone
. ZANST-OLD: backup of older zanst version
. ZANZV: zonas de vida, life zones (according to TSC 1985)

[ROAD]

. ZANTOP: topography of North Eastern Atl. Zone

[GCM]

. GCM: clip from <ZANST> of Guacimo area
. GCMCLIP: clip-window of Guacimo area ([costa.clip]CLIP-PILOT)
. GCMRR: clip from <ZANRR> of Guacimo area
. GCMZV: clip from union of <ZANST> and <ZANZV>

[NEG]

. NEG: clip from <ZANST> of Neguev area
. NEGCLIP: clip-window of Neguev area
. NEGRR: clip from ZANRR of Neguev area

[POC]

. POC: clip from <ZANST> of Pocora area
. POCCLIP: clip-window Pocora area ([costa.clip]CLIP-POCORA)
. POCRR: clip from <ZANRR> of Pocora area

[FLD]

. FLDCL: clip-window of Finca Los Diamantes
. FLDPA: parcel boundaries of Finca Los Diamantes
. FLDRR: topography of Finca Los Diamantes
. FLDST: soil and land units of Finca Los Diamantes

[GRS]

. LUZGRST: land use Guacimo, Rio Jimenez, Siquirres.
. PMUGRS: 'physical' mapping units clipped from ZANST of LUZGRST area
. PMULUZ: union of LUZGRST and PMUGRS
. PMULUZD: simplified map of PMULUZ (small polygons generated by UNION operation are removed)

[AP80]

. C11074RR: Topography for photo L11074 in camera coordinates
. C11074ST: Siesta mapping units for photo L11074 in camera coordinates
. L11074RR: Topography for photo L11074 in terrain coordinates
. L11074ST: Siesta mapping units for photo L11074 in terrain coordinates
. L11074CL: Clip window of photo L11074CL in terrain coordinates
. L17021CL: Clip window of photo L17021CL in terrain coordinates
. FOTKADER: Clip window of photo in camera coordinates
. VWK1721RR: Topography of photo L17021 in terrain coordinates
. VWK1721ST: Siesta mapping units for photo L17021 in terrain coordinates
. VWKSAMP: Sample points on photo L17021 in terrain coordinates

[KLAD]

. ANNO-CLIP: window used for A0-plots on versatec plotter
. ANNO-UNIT: annotation coverage used for A1-plots
. ANNO-UNIT2: annotation coverage used for A1-plots
. COSMAP: map of Costa Rica (coordinates in digitizer units)
. COSPROV: map with provinces of Costa Rica (COSMAP-coordinates)
. COSINDEX: grid covering Costa Rica (COSMAP-coordinates)
. LULOG: logo of AUW
. TOPMAP: map of Costa Rica slightly different from COSMAP (COSMAP-coordinates)
. TOPMAP2: map of Costa Rica slightly different from TOPMAP (COSMAP-coordinates)
. TOPMAP3: map of Costa Rica, coordinates transformed to ZANST-coordinates
. ZANANNO: Boundaries of ZANST used for A0-plots
. ZANBRD: Boundaries of ZANST
. ZANST: Backup of actually used coverage ZANST
. ZANST-OLD1: Backup of latest used coverage ZANST
. A21, A23: character 'a' to be copied into textfonts 21 and 23
. B23: character 'b' used for creation of textfonts 21 and 23
. E21, E23: character 'e' to be copied into textfonts 21 and 23
. I21, I23: character 'i' to be copied into textfonts 21 and 23
. N21, N23: character 'n' to be copied into textfonts 21 and 23
. O21, O23: character 'o' to be copied into textfonts 21 and 23
. U21, U23: character 'u' to be copied into textfonts 21 and 23
. TILDE23: character '~' used for creation of textfonts 21 and 23

[TOPS]

ABRA	AGUA-FRIA	AMUBRI	BARBA
BARBILLA	BONILLA	CAHUITA	CALIFORNIA
CARRILLO	CHAPARRON	CHIRRIPO	CHIRRIPO-ATL
CLIP-3347	CLIP-3446	CLIP-3447	CLIP-3448
CLIP-3546	CLIP-3547	COLORADO	CUTRIS
ESTRELLA	GUACIMO	GUAPILES	ISTARU
MATAMA	MATINA	MGRID2	MOIN
MOIN-NORTE	PARISMINA	POAS	PUNTA
PUNTB	RIO-BANANO	RIO-CUARTO	RIO-SUCIO
SAN-ANDRES	TELIRE	TOPS	TORTUGUERO
TRINIDAD	TUCURRIQUE		

. TOPNDX: Polygon coverages storing all topsheet clipping edges mentioned above (see annex 9)
. TOPPNT: Point coverage storing all corners of topsheet clipping edges (see annex 9)

ANNEX 2 LIST OF MOST IMPORTANT DATAFILES

. ASU.DBF	Stores all soil associations found in file SMASU.DBF, used by program ASU.PRG
. ASU-LST.DBF	Stores soil associations, used by program ASU-LST.PRG
. LE.DBF	Stores landevaluation data per TU-ID
. LUTSU.DBF	Stores landevaluation data per TU-ID only for items LUTSU1 and LUTSU2 of file LE.DBF, used by program LUTSU.PRG
. MUTP1.DBF	Per MU-ID the presence (in %) of physiographic units (TP1-attribute values) is indicated, used by program TP1.PRG
. PHASU.DBF	Stores soilphases (combinations of TU-ID and SU-ID) and the MU-ID's where these associations occur, used by program PHASU.PRG
. PHYS-CODE.DBF	Stores physiographic codes per TU-ID, contents of file is generated by program PHYS-CODE.PRG
. REQ.DBF	Stores requirement en suitability class data per TU-ID for the items NU-C1,NU-C2,AG-C12,OX-C12,LA-C12,ER-C1,ER-C2,LSU-C1,LSU-C2, contents generated by programs REQ.PRG and SUC.PRG
. SMASU.DBF	Stores for each MU-ID all different combinations of two soiltypes or soilphases (associated soils: ASU1, ASU2) and the TU-ID's of these types or phases (ATU1, ATU2), contents generated by program SMASU.PRG
. SMU.DBF	Stores per MU-ID for TU1 to TU5 the matching SU-ID's in items SU1-ID ... SU5-ID, contents generated by program SMU.PRG, used by program SMASU.PRG
. STMU.DBF	Stores per MU-ID the TU-ID's and area percentages of Terrain Units present within the Mapping Unit
. SU.DBF	Stores data on Soil Units
. SULUT.DBF	Stores per MU-ID the area percentage distribution of LUTSU classes, contents generated by program LUTSU.PRG
. SUTU.DBF	Stores data of SU.DBF per TU-ID (data not up to date)
. TU.DBF	Stores data on Terrain Units
. TU-HA.DBF	Stores total ha per TU-ID, contents generated and used by program TP-HA.PRG

ANNEX 3 LIST OF TEXTFILES

▲ *MAP TITLES*

MAPTIT-S1.TXT	zona atlantica noreste
MAPTIT-E1.TXT	north eastern atlantic zone
MAPTIT-S21.TXT	area de guacimo
MAPTIT-S31.TXT	area de pocora
MAPTIT-S41.TXT	neguev
MAPTIT-S42.TXT	area de neguev

▲ *SUBTITLES*

SUBTIT-S1.TXT	unidades cartograficas y topografia
SUBTIT-S21.TXT	requirimiento de labranza de cultivos exigentes y no exigentes
SUBTIT-S22.TXT	requirimiento de nutrientes de cultivos exigentes
SUBTIT-S23.TXT	riesgo de erosion de cultivos exigentes
SUBTIT-S24.TXT	requirimiento de agua de cultivos exigentes y no exigentes
SUBTIT-S25.TXT	requirimiento de oxigeno de cultivos exigentes y no exigentes
SUBTIT-S26.TXT	aptitud para cultivos exigentes
SUBTIT-S27.TXT	aptitud para cultivos no exigentes
SUBTIT-S28.TXT	capacidad de uso segun cct (1985)
SUBTIT-S31.TXT	identificadores del area
SUBTIT-S43.TXT	requirimiento de nutrientes
SUBTIT-E43.TXT	nutrient requirements
SUBTIT-S44.TXT	riesgo de erosion
SUBTIT-S45.TXT	evaluacion de la aptitud
SUBTIT-S46.TXT	suelos
SUBTIT-S47.TXT	geologia, forma de terreno (mayor y minor)
SUBTIT-S48.TXT	subclases de aptitud
SUBTIT-E48.TXT	suitability subclasses
SUBTIT-E53.TXT	TU1
SUBTIT-E54.TXT	TU2
SUBTIT-E55.TXT	TU3
SUBTIT-E56.TXT	TU4

▲ *LEGEND TITLES*

LEGTIT-S1.TXT	fisiografia
LEGTIT-E1.TXT	physiography
LEGTIT-S2.TXT	desarrollo del suelo
LEGTIT-E2.TXT	soil development stage
LEGTIT-S3.TXT	profundidad del suelo
LEGTIT-E3.TXT	soil depth
LEGTIT-E4.TXT	distribution of areas suitable for requiring crops
LEGTIT-S4.TXT	porcentaje del area de cada unidad cartografica, apto para cultivos exigentes
LEGTIT-E5.TXT	distribution of areas suitable for moderately requiring crops
LEGTIT-E6.TXT	distribution of areas suitable for acid tolerant or very little requiring crops
LEGTIT-E7.TXT	distribution of areas with strongly restricted agricultural use
LEGTIT-E8.TXT	distribution of areas to be protected
LEGTIT-S9.TXT	clasificacion de la aptitud para tipos mayores de uso de la tierra
LEGTIT-E9.TXT	suitability classification for major land use types
LEGTIT-S10.TXT	geologia (predominante)
LEGTIT-E10.TXT	(dominant) geology
LEGTIT-S11.TXT	desarrollo del suelo
LEGTIT-E11.TXT	soil development
LEGTIT-S21.TXT	grado de suficiencia del suelo predominante
LEGTIT-S22.TXT	clase de aptitud del suelo predominante
LEGTIT-S23.TXT	clases de capacidad de uso del suelo predominante
LEGTIT-S24.TXT	leyenda
LEGTIT-S24.TXT	codigo taxonomico del suelo predominante
LEGTIT-S41.TXT	leyenda
LEGTIT-E41.TXT	legend
LEGTIT-S42.TXT	leyenda de suelos
LEGTIT-E42.TXT	soil legend

▲ *MAP NOTES*

MAPNOT-S1.TXT	observacion: solo se indico la unidad de terreno principal
MAPNOT-E1.TXT	note: only dominant terrain unit (tu1) indicated on map
MAPNOT-E2.TXT	note: information on all terrain units
MAPNOT-E3.TXT	note: information on dominant terrain unit

▲ *MAP SCALES*

SCAL-S1.TXT	escala 1:200000
SCAL-E1.TXT	scale 1:200000

▲ *AUTHORS*

AUTHOR1.TXT	wielemaker w.g. & a.p. oosterom, 1991 @ agricultural university wageningen
AUTHOR2.TXT	wielemaker w.g. & a.p. oosterom, 1991, @ agricultural university wageningen

ANNEX 4 DESCRIPTION OF COVERAGES *

▲ *SOIL AND LAND INFORMATION*

COVERAGE: <ZANST>
CONTENTS: ZANST is an abbreviation of 'Zona Atlantica Noreste Suelos y Tierras'. This coverage has a polygon topology. The mapping unit identifier or MU-ID, which is number assigned to each polygon is called ZANST-ID. The MU-ID is related to a datafile (STMU.DBF) that describes the composition of a mapping unit with regard to soiltype and landform. Soil and land information are recorded in separate files, SU.DBF and TU.DBF respectively.
CHARACT.:
- polygon topology
- number of polygons: 758
- number of arcs: 2098
- (xmin,ymin): (532000, 218450)
- (xmax,ymax): (642267, 327338)
- size: 1500 blocks

REL. FILES: The composition of the Mapping Units can be retrieved from the Mapping Unit Composition Table: STMU.DBF. The TU.DBF contains the properties of the TU's. The SU.DBF describes the soil properties. Landevaluation data is stored in the LE.DBF. Listings of these tables can be found in annex 5.

COVERAGE: <GCM>
CONTENTS: Coverage <GCM> is clipped from <ZANST> and covers Guacimo area.
CHARACT.:
- polygon topology
- number of polygons: 211
- number of arcs: 602
- (xmin,ymin): (555000, 230000)
- (xmax,ymax): (590000, 255000)
- size: 317 blocks

REL. FILES: TU.DBF, SU.DBF,LE.DBF

COVERAGE: <NEG>
CONTENTS: Coverage <NEG> is clipped from <ZANST> and covers Neguev area.
CHARACT.:
- polygon topology
- number of polygons: 117
- number of arcs: 328
- (xmin,ymin): (573000, 230000)
- (xmax,ymax): (590000, 255000)
- size: 182 blocks

REL. FILES: NEGMU.DBF, TU.DBF, SU.DBF, LE.DBF.

COVERAGE: <POC>
CONTENTS: Coverage <POC> is clipped from <ZANST> and covers Pocora area.
CHARACT.:
- polygon topology
- number of polygons: 33
- number of arcs: 89
- (xmin,ymin): (575000, 234000)
- (xmax,ymax): (587000, 2455000)
- size: 59 blocks

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* Name and contents of the coverage are given, some characteristics are listed; to indicate the size of the coverage minimum and maximum (x,y) values in map coordinates (meters) are mentioned as well as the data storage space in blocks (1 Mb = 2000 blocks). In some cases the most important files that can be related to the coverage are mentioned.

▲ *Land use INFORMATION*

COVERAGE: <ZANLUZ>
CONTENTS: Land use zones of an area approximately covering the area of <ZANST>. derived from interpretation of satellite images. (E.J. Huising 1991)
CHARACT.:
- polygon topology
- number of polygons: 196
- number of arcs: 588
- (xmin,ymin): (519147, 212972)
- (xmax,ymax): (645990, 327319)
- size: 365 blocks

COVERAGE: <LUZGRST>
CONTENTS: Land use of the area of Guacimo, Rio Jimenez and Siquirres, Classes of area coverage (E.J. Huising, 1992).
CHARACT.:
- polygon topology
- number of polygons: 147
- number of arcs: 437
- (xmin,ymin): (565547, 227699)
- (xmax,ymax): (594825, 259774)
- size: 301 blocks

COVERAGE: <PMULUZD>
CONTENTS: Union of maps LUZGRST and ZANST clipped for the area of LUZGRST. Information on land use as well as land and soil properties.
CHARACT.:
- polygon topology
- number of polygons: 566
- number of arcs: 1712
- (xmin,ymin): (565547, 227699)
- (xmax,ymax): (594825, 259774)
- size: 614 blocks

▲ *ADMINISTRATIVE INFORMATION*

COVERAGE: <ZANADM>
CONTENTS: District boundaries within the North eastern Atl. Zone
CHARACT.:
- polygon topology
- number of polygons: 38
- number of arcs: 92
- (xmin,ymin): (532464, 218461)
- (xmax,ymax): (643587, 324033)
- size: 183 blocks

COVERAGE: <ZANIDA>
CONTENTS: Location of IDA settlements within the North eastern Atl. Zone
CHARACT.:
- polygon topology
- number of polygons: 114
- number of arcs: 242
- (xmin,ymin): (532553, 218643)
- (xmax,ymax): (640067, 299766)
- size: 199 blocks

COVERAGE: <AGUA-FRIA>
CONTENTS: Clip window of area of 1:50000 topsheet Agua Fria. See annex 8 for a list of same kind of coverages.
CHARACT.:
- polygon topology
- number of polygons: 1
- number of arcs: 1
- (xmin,ymin): (563854, 257133)
- (xmax,ymax): (591269, 275628)
- size: 23 blocks

▲ *TOPOGRAPHIC INFORMATION*

COVERAGE: <ZANTOP>
CONTENTS: The coverage <ZANTOP> stores line features which indicate the Roads and Rivers of an area that is slightly larger than the area of coverage <ZANST>. Attribute values are shown in table 2.3.
CHARACT.:
- line topology
- number of arcs: 6432
- (xmin,ymin): (529795, 205828)
- (xmax,ymax): (642267, 327338)
- size: 2215 blocks

REL. FILES: TOPO.DBF

COVERAGE: <ZANRR>
CONTENTS: The coverage <ZANRR> is a clip from the coverage <ZANTOP>, it covers the same area as <ZANST>.
CHARACT.:
- line topology
- number of arcs: 6497
- (xmin,ymin): (532000, 218450)
- (xmax,ymax): (642267, 327338)
- size: 2120 blocks

COVERAGE: <GCMRR>
CONTENTS: The coverage is clipped from <ZANTOP> and covers Guacimo area.
CHARACT.:
- line topology
- number of arcs: 1972
- (xmin,ymin): (555000, 230000)
- (xmax,ymax): (590000, 255000)
- size: 575 blocks

COVERAGE: <NEGRR>
CONTENTS: Coverage is clipped from <ZANTOP> and covers Neguev area.
CHARACT.:
- line topology
- number of arcs: 807
- (xmin,ymin): (573000, 230000)
- (xmax,ymax): (590000, 255000)
- size: 262 blocks

COVERAGE: <POCRR>
CONTENTS: Coverage is clipped from <ZANTOP> and covers Pocora area.
CHARACT.:
- line topology
- number of arcs: 198
- (xmin,ymin): (575353, 234067)
- (xmax,ymax): (586504, 244723)
- size: 65 blocks

▲ *DIFFERENT KIND OF INFORMATION*

COVERAGE: <ZANZV>
CONTENTS: Map with life zones (zonas da vida) according to TSC 1985.
CHARACT.:
- polygon topology
- number of polygons: 15
- number of arcs: 46
- (xmin,ymin): (532000, 218450)
- (xmax,ymax): (646186, 331049)
- size: 110 blocks

COVERAGE: <FLDST>
CONTENTS: Soil map of finca Los Diamantes mapping scale 1:10000; soil classification differs from SIESTA.
CHARACT.:
- polygon topology
- number of polygons: 73
- number of arcs: 209
- (xmin,ymin): (560442, 243731)
- (xmax,ymax): (562321, 249730)
- size: 149 blocks

DATAFILE NAME: STMU.DBF VERSION 1.0

REC	MU-ID	MU-HA	TU1-ID	TU1-PC	TU2-ID	TU2-PC	TU3-ID	TU3-PC	TU4-ID	TU4-PC	TU5-ID	TU5-PC
1	1	5,918.8	32	100	0	0	0	0	0	0	0	0
2	2	1,861.5	60	60	119	40	0	0	0	0	0	0
3	3	421.8	119	60	120	30	122	10	0	0	0	0
4	4	529.8	120	60	122	40	0	0	0	0	0	0
5	5	1,246.6	46	80	85	20	0	0	0	0	0	0
6	6	1,823.5	126	100	0	0	0	0	0	0	0	0
7	7	185.2	69	100	0	0	0	0	0	0	0	0
8	8	1,042.4	112	80	126	20	0	0	0	0	0	0
9	9	1,209.1	118	70	126	30	0	0	0	0	0	0
10	10	22,565.6	2	100	0	0	0	0	0	0	0	0
11	11	2,502.8	4	100	0	0	0	0	0	0	0	0
12	12	11,475.8	47	40	49	40	43	20	0	0	0	0
13	13	857.3	128	100	0	0	0	0	0	0	0	0
14	14	448.2	129	70	38	30	0	0	0	0	0	0
15	15	613.9	38	70	129	30	0	0	0	0	0	0
16	16	4,700.1	35	70	34	30	0	0	0	0	0	0
17	17	1,644.1	34	100	0	0	0	0	0	0	0	0
18	18	384.9	130	100	0	0	0	0	0	0	0	0
19	19	0.0	131	60	132	40	0	0	0	0	0	0
20	20	10,550.9	134	60	133	20	8	20	0	0	0	0
21	21	16,729.3	136	70	135	30	0	0	0	0	0	0
22	22	991.9	153	70	14	30	0	0	0	0	0	0
23	23	7,689.0	54	80	135	20	0	0	0	0	0	0
24	24	2,727.8	139	40	138	20	137	20	140	20	0	0
25	25	4,668.9	134	60	133	30	73	10	0	0	0	0
26	26	927.3	54	100	0	0	0	0	0	0	0	0
27	27	29,926.0	73	50	6	30	8	20	0	0	0	0
28	28	11,431.5	73	100	0	0	0	0	0	0	0	0
29	29	1,659.2	87	70	88	30	0	0	0	0	0	0
30	30	3,129.7	70	100	0	0	0	0	0	0	0	0
31	31	3,548.4	72	50	12	50	0	0	0	0	0	0
32	32	3,707.0	3	80	72	20	0	0	0	0	0	0
33	33	1,408.2	133	100	0	0	0	0	0	0	0	0
34	34	316.0	142	100	0	0	0	0	0	0	0	0
35	35	447.4	143	100	0	0	0	0	0	0	0	0
36	36	12,104.7	144	60	145	40	0	0	0	0	0	0
37	37	18,501.8	69	80	146	20	0	0	0	0	0	0
38	38	4,846.1	49	60	8	20	74	20	0	0	0	0
39	39	409.2	147	70	149	30	0	0	0	0	0	0
40	40	5,319.2	12	70	71	30	0	0	0	0	0	0
41	41	13,650.6	57	70	59	30	0	0	0	0	0	0
42	42	1,048.1	59	70	57	30	0	0	0	0	0	0
43	43	23,265.4	49	30	47	20	40	20	26	20	9	10
44	44	20,854.1	7	50	1	20	47	20	13	10	0	0
45	45	6,201.7	43	50	49	30	47	20	0	0	0	0
46	46	1,762.5	152	80	148	20	0	0	0	0	0	0
47	47	1,423.0	3	60	7	40	0	0	0	0	0	0
48	48	1,010.2	148	80	152	20	0	0	0	0	0	0
49	49	0.0	60	40	49	30	43	20	47	10	0	0
50	50	5,306.2	47	30	8	30	2	20	73	20	0	0
51	51	763.6	151	80	150	20	0	0	0	0	0	0
52	52	1,167.5	63	40	7	30	11	30	0	0	0	0
53	53	8,071.6	60	30	49	30	43	30	47	10	0	0
54	54	4,540.2	3	100	0	0	0	0	0	0	0	0
55	55	628.2	98	100	0	0	0	0	0	0	0	0

DATAFILE NAME: STMU.DBF VERSION 1.0

REC	MU-ID	MU-HA	TU1-ID	TU1-PC	TU2-ID	TU2-PC	TU3-ID	TU3-PC	TU4-ID	TU4-PC	TU5-ID	TU5-PC
56	56	0.0	75	100	0	0	0	0	0	0	0	0
57	57	592.3	42	70	79	30	0	0	0	0	0	0
58	61	6,532.1	21	80	55	20	0	0	0	0	0	0
59	62	2,422.7	55	80	21	20	0	0	0	0	0	0
60	63	1,623.6	55	50	21	30	63	10	60	10	0	0
61	64	12,002.9	55	40	49	30	60	20	63	10	0	0
62	65	1,525.8	40	50	43	30	47	20	0	0	0	0
63	66	0.0	73	50	6	30	8	20	0	0	0	0
64	67	213.8	94	80	25	20	0	0	0	0	0	0
65	68	0.0	139	40	138	20	137	20	140	20	0	0
66	69	1,197.4	59	80	76	20	0	0	0	0	0	0
67	70	6,311.7	59	60	7	30	73	10	0	0	0	0
68	71	4,393.0	59	60	47	10	40	10	120	10	76	10
69	72	962.0	95	50	7	30	1	20	0	0	0	0
70	73	688.5	161	100	0	0	0	0	0	0	0	0
71	74	127.8	162	100	0	0	0	0	0	0	0	0
72	75	649.3	159	100	0	0	0	0	0	0	0	0
73	77	0.0	151	80	150	20	0	0	0	0	0	0
74	79	5,818.1	77	40	9	40	166	20	0	0	0	0
75	80	9,976.8	60	40	63	20	168	20	40	10	47	10
76	82	1,318.3	80	100	0	0	0	0	0	0	0	0
77	83	5,526.2	84	80	85	20	0	0	0	0	0	0
78	84	5,041.6	87	100	0	0	0	0	0	0	0	0
79	85	2,029.8	88	100	0	0	0	0	0	0	0	0
80	86	632.5	10	100	0	0	0	0	0	0	0	0
81	87	6,619.7	78	70	79	30	0	0	0	0	0	0
82	88	1,095.2	42	70	79	30	0	0	0	0	0	0
83	89	1,040.5	43	70	44	30	0	0	0	0	0	0
84	90	3,408.4	2	70	7	30	0	0	0	0	0	0
85	91	2,756.5	9	70	166	30	0	0	0	0	0	0
86	94	9,022.2	26	40	43	30	40	20	55	10	0	0
87	95	1,856.5	47	50	43	40	13	10	0	0	0	0
88	96	24,567.9	60	50	167	30	63	20	0	0	0	0
89	97	5,913.5	8	70	47	20	49	10	0	0	0	0
90	98	3,753.6	63	50	47	30	40	10	168	10	0	0
91	99	1,866.4	47	40	9	40	40	20	0	0	0	0
92	100	2,541.9	60	60	25	40	0	0	0	0	0	0
93	101	3,343.0	25	100	0	0	0	0	0	0	0	0
94	102	1,367.0	81	100	0	0	0	0	0	0	0	0
95	103	229.6	83	100	0	0	0	0	0	0	0	0
96	104	497.1	31	100	0	0	0	0	0	0	0	0
97	106	357.0	128	60	31	40	0	0	0	0	0	0
98	107	2,818.5	62	100	0	0	0	0	0	0	0	0
99	109	794.5	17	100	0	0	0	0	0	0	0	0
100	110	1,289.6	23	100	0	0	0	0	0	0	0	0
101	111	0.0	169	100	0	0	0	0	0	0	0	0
102	112	362.5	91	100	0	0	0	0	0	0	0	0
103	113	1,339.1	87	60	60	20	63	20	0	0	0	0
104	115	567.2	82	100	0	0	0	0	0	0	0	0
105	116	977.1	40	40	44	20	60	20	63	20	0	0
106	117	1,295.5	89	100	0	0	0	0	0	0	0	0
107	118	901.3	18	80	90	20	0	0	0	0	0	0
108	119	1,191.5	93	100	0	0	0	0	0	0	0	0
109	120	3,632.0	21	80	92	20	0	0	0	0	0	0
110	121	1,202.1	60	40	63	20	21	20	168	20	0	0

DATAFILE NAME: STHU.DBF

VERSION 1.0

REC	HU-ID	HU-HA	TU1-ID	TU1-PC	TU2-ID	TU2-PC	TU3-ID	TU3-PC	TU4-ID	TU4-PC	TU5-ID	TU5-PC
111	122	670.3	93	70	40	30	0	0	0	0	0	0
112	123	895.9	21	80	40	20	0	0	0	0	0	0
113	124	6,891.3	40	60	44	20	43	10	13	10	0	0
114	125	2,776.8	58	100	0	0	0	0	0	0	0	0
115	126	5,106.9	19	70	55	30	0	0	0	0	0	0
116	127	779.0	90	80	18	20	0	0	0	0	0	0
117	128	1,902.6	94	100	0	0	0	0	0	0	0	0
118	129	1,762.6	19	100	0	0	0	0	0	0	0	0
119	130	1,167.4	60	30	49	30	40	30	13	10	0	0
120	131	187.7	40	100	0	0	0	0	0	0	0	0
121	132	864.9	64	70	49	30	0	0	0	0	0	0
122	133	4,480.5	39	100	0	0	0	0	0	0	0	0
123	134	2,989.2	95	70	167	30	0	0	0	0	0	0
124	135	2,318.1	49	50	47	20	95	20	40	10	0	0
125	136	1,184.8	55	100	0	0	0	0	0	0	0	0
126	137	4,400.1	43	60	44	40	0	0	0	0	0	0
127	138	1,104.2	96	40	49	40	47	20	0	0	0	0
128	139	1,672.5	97	60	49	20	8	20	0	0	0	0
129	140	4,281.9	98	60	99	40	0	0	0	0	0	0
130	141	4,258.7	30	100	0	0	0	0	0	0	0	0
131	142	1,418.8	33	100	0	0	0	0	0	0	0	0
132	143	2,835.2	100	100	0	0	0	0	0	0	0	0
133	144	2,408.3	37	100	0	0	0	0	0	0	0	0
134	145	6,046.5	61	100	0	0	0	0	0	0	0	0
135	146	550.6	31	50	15	50	0	0	0	0	0	0
136	147	348.8	101	100	0	0	0	0	0	0	0	0
137	148	3,617.5	22	100	0	0	0	0	0	0	0	0
138	149	1,612.1	23	50	48	30	104	20	0	0	0	0
139	150	176.9	23	100	0	0	0	0	0	0	0	0
140	151	1,654.6	102	50	103	30	29	20	0	0	0	0
141	152	2,956.3	103	70	102	30	0	0	0	0	0	0
142	153	712.6	36	100	0	0	0	0	0	0	0	0
143	154	1,153.6	105	50	106	30	104	20	0	0	0	0
144	155	1,717.1	89	80	107	20	0	0	0	0	0	0
145	156	459.7	108	100	0	0	0	0	0	0	0	0
146	157	2,512.4	110	80	109	20	0	0	0	0	0	0
147	158	2,763.0	111	60	112	40	0	0	0	0	0	0
148	159	3,287.9	128	60	36	40	0	0	0	0	0	0
149	160	915.2	20	80	113	20	0	0	0	0	0	0
150	161	937.0	114	70	115	30	0	0	0	0	0	0
151	162	916.9	117	90	83	10	0	0	0	0	0	0
152	163	469.0	109	80	110	20	0	0	0	0	0	0
153	164	1,560.9	56	50	118	50	0	0	0	0	0	0
154	166	746.0	36	80	37	20	0	0	0	0	0	0
155	167	149.8	123	100	0	0	0	0	0	0	0	0
156	168	284.0	124	100	0	0	0	0	0	0	0	0
157	169	2,164.4	125	100	0	0	0	0	0	0	0	0
158	170	663.3	114	80	115	20	0	0	0	0	0	0
159	171	48.3	5	100	0	0	0	0	0	0	0	0
160	172	1,444.4	91	50	31	20	18	20	79	10	0	0
161	173	0.0	63	50	60	30	8	20	0	0	0	0
162	181	441.0	165	100	0	0	0	0	0	0	0	0

DATAFILE NAME: TU.DBF VERSION 1.0

REC	TU-ID	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10
1	0	99	99	99	99	99	99	99	99	99	99
2	1	5	1	10	12	27	1	4	0	0	1
3	2	5	1	10	12	28	1	4	0	0	2
4	3	5	1	10	14	27	1	4	0	0	3
5	4	3	4	7	15	29	1	99	0	0	0
6	5	1	8	1	15	29	1	99	0	0	0
7	6	3	4	7	8	25	1	4	0	0	64
8	7	3	4	7	8	25	1	4	0	0	65
9	8	3	4	7	3	25	1	4	0	0	66
10	9	3	4	7	8	25	1	4	0	0	67
11	10	3	4	7	6	20	1	4	0	0	68
12	11	4	2	9	10	20	1	4	0	0	69
13	12	4	2	9	10	20	1	4	0	0	70
14	13	3	4	7	7	20	1	4	0	0	72
15	14	3	4	6	6	23	1	4	0	0	73
16	15	1	8	3	1	5	4	1	3	3	48
17	17	3	6	6	3	17	1	2	0	2	23
18	18	3	4	6	3	19	1	2	0	1	24
19	19	3	4	6	3	20	1	4	0	0	25
20	20	1	9	3	1	8	3	1	3	2	26
21	21	3	4	6	3	20	1	4	0	0	28
22	22	3	6	6	3	15	2	2	2	3	29
23	23	3	7	6	3	16	2	2	2	2	30
24	25	3	6	6	3	17	1	2	2	0	31
25	26	3	4	7	7	20	1	4	0	0	32
26	29	1	8	3	2	19	1	1	2	2	35
27	30	1	9	1	1	4	6	3	2	2	36
28	31	3	7	6	3	16	3	2	1	1	37
29	32	3	7	6	3	17	2	2	1	1	38
30	33	1	8	1	1	2	5	3	0	0	39
31	34	1	8	1	1	1	5	4	0	0	41
32	35	1	8	1	1	2	5	4	1	2	42
33	36	1	9	3	1	8	5	4	1	1	43
34	37	1	9	1	3	1	3	4	0	0	44
35	38	1	9	3	1	1	3	2	0	0	45
36	39	3	4	6	3	20	1	4	0	0	46
37	40	3	4	7	7	20	1	4	0	0	47
38	42	3	4	7	11	21	1	4	0	0	50
39	43	3	4	7	8	22	1	4	0	0	51
40	44	3	4	7	6	20	1	4	0	0	53
41	46	3	4	7	2	19	1	4	0	0	54
42	47	3	4	7	7	20	1	4	0	0	55
43	48	3	7	6	3	17	2	2	2	3	57
44	49	3	4	7	7	21	1	4	0	0	58
45	54	3	4	6	3	24	1	4	0	0	59
46	55	3	5	5	4	25	1	4	0	0	60
47	56	1	9	3	1	6	3	3	1	1	4
48	57	1	11	2	1	6	5	3	0	0	6
49	58	3	7	6	1	17	2	2	0	0	7
50	59	1	11	2	1	6	4	3	0	0	10

DATAFILE NAME: TU.DBF VERSION 1.0

REC	TU-ID	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10
51	60	3	7	6	1	17	4	3	0	0	11
52	61	1	9	3	1	6	4	3	0	0	17
53	62	3	7	6	1	16	3	3	0	0	18
54	63	3	5	6	1	20	5	4	0	0	19
55	64	3	7	6	3	17	1	3	0	0	21
56	69	2	14	4	1	13	5	3	0	0	13
57	70	4	2	9	9	20	1	4	0	0	68
58	71	4	2	9	9	20	1	4	0	0	47
59	72	4	2	9	9	20	1	4	0	0	33
60	73	5	1	10	12	27	1	4	0	0	3
61	74	3	5	6	1	20	3	4	0	0	19
62	75	5	1	10	14	28	1	4	0	0	2
63	76	1	11	2	15	29	1	99	0	0	0
64	77	3	5	7	7	20	2	4	0	0	8
65	78	3	4	6	6	19	1	4	4	4	68
66	79	3	4	6	6	20	1	4	0	2	72
67	80	3	5	6	3	20	1	4	0	0	15
68	81	3	4	6	3	18	2	4	2	2	28
69	82	3	7	6	3	16	2	4	0	0	12
70	83	3	4	6	2	19	1	2	1	1	22
71	84	3	4	6	3	20	1	4	0	0	32
72	85	3	4	6	2	20	1	4	0	0	51
73	87	3	4	6	3	19	1	4	0	0	47
74	88	3	4	6	3	18	2	4	2	2	47
75	89	3	4	6	3	19	2	4	1	2	25
76	90	3	7	6	3	17	1	2	0	0	52
77	91	3	4	6	3	19	1	4	1	1	25
78	92	3	4	6	2	20	1	4	0	0	47
79	93	3	5	6	3	20	1	4	0	0	27
80	94	3	4	6	3	18	1	4	1	1	28
81	95	3	7	6	1	17	3	3	0	0	11
82	96	1	11	3	1	6	3	3	0	0	10
83	97	3	5	6	1	20	4	4	0	0	19
84	98	3	4	7	11	21	1	4	0	0	56
85	99	3	4	7	8	22	1	4	0	0	51
86	100	1	9	1	1	6	4	3	0	0	10
87	101	3	7	6	3	16	2	2	1	0	37
88	102	1	8	3	1	5	2	1	3	3	48
89	103	1	8	3	1	5	6	1	3	3	48
90	104	3	4	6	2	19	2	2	2	2	22
91	105	3	7	6	3	16	2	2	0	1	30
92	106	3	7	6	3	16	2	2	0	1	57
93	107	3	5	6	3	18	2	4	2	3	25
94	108	1	9	3	1	7	2	3	0	0	17
95	109	1	9	3	1	6	5	3	0	0	10
96	110	1	9	3	1	6	3	3	0	0	10
97	111	1	9	3	1	6	3	3	0	0	6
98	112	1	9	3	1	6	5	3	2	3	6
99	113	1	9	3	1	8	5	1	3	4	26
100	114	1	9	3	1	9	3	2	0	0	40

DATAFILE NAME: TU.DBF VERSION 1.0

REC	TU-ID	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10
101	115	1	9	3	1	9	5	2	2	3	40
102	117	3	7	6	3	17	1	2	0	0	7
103	118	1	9	3	1	6	5	3	1	2	4
104	119	3	7	6	1	17	2	3	0	0	11
105	120	5	1	10	13	27	1	4	0	0	3
106	122	3	4	6	2	25	1	4	0	0	65
107	123	1	9	3	1	6	5	3	0	0	17
108	124	1	9	3	1	3	5	3	1	2	39
109	125	3	7	6	3	16	2	2	2	2	38
110	126	1	9	1	1	6	6	3	3	3	4
111	128	1	9	3	1	2	3	3	0	0	44
112	129	1	9	3	1	4	5	3	0	0	44
113	130	1	8	1	1	2	5	4	0	0	44
114	131	1	8	3	1	1	5	4	2	4	34
115	132	1	8	3	1	2	5	4	0	0	34
116	133	3	4	7	11	26	1	4	0	0	61
117	134	3	4	7	8	25	1	4	0	0	58
118	135	3	4	6	2	25	1	4	0	0	58
119	136	3	5	6	3	24	1	4	0	0	60
120	137	3	4	6	3	23	2	4	3	1	62
121	138	3	4	6	3	23	2	4	2	2	59
122	139	3	4	6	3	26	1	4	1	1	60
123	140	3	4	6	3	23	2	4	2	2	58
124	142	1	10	3	1	6	4	3	0	0	9
125	143	1	10	3	1	6	4	3	0	2	5
126	144	2	12	4	1	5	5	3	0	0	14
127	145	2	12	4	1	10	6	3	0	0	14
128	146	2	14	4	1	13	6	3	0	0	13
129	147	1	10	3	1	5	4	3	0	0	16
130	148	1	10	3	1	6	6	3	0	0	17
131	149	1	10	3	1	5	3	3	0	0	16
132	150	3	4	7	2	23	2	4	4	4	68
133	151	3	4	7	2	23	2	4	0	0	59
134	152	1	10	3	1	6	4	3	0	0	17
135	153	3	4	6	6	23	1	4	4	4	68
136	159	2	14	8	1	30	4	3	0	0	20
137	160	2	14	5	1	13	4	3	0	0	13
138	161	2	13	5	1	12	4	4	0	0	63
139	162	4	3	8	3	11	1	1	0	0	74
140	163	2	13	5	1	11	4	3	0	0	20
141	164	3	7	6	1	16	5	2	1	0	38
142	165	3	7	6	1	16	6	2	2	2	38
143	166	3	4	7	7	20	1	4	0	0	71
144	167	3	4	6	2	25	1	4	0	0	66
145	168	3	4	6	2	25	1	4	0	0	67
146	169	3	4	7	11	26	1	4	0	0	58

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REC	SU-ID	SU-NM	SK1	SK2	SK3	SK4	SK5	SK6	SP1	SP2	SP3	SP4	SP5	SP6	SP7	SP8	SP9	SP10	SP11	SP12	SP13	ST1	ST2	ST3-P1	ST3-P2	ST4-P1	ST4-P2
41	41	BONILLA ARRIBA	M	M1	M13	M131		M1311	1	1		2	4f	4	233	3	2	2	3	3	4	D	DUD	DUDHY		PA	
42	42	LA ROCA	M	M1	M13	M132		M1321	1	1		2	3f	4	233	3	2	2	4	3	4	D	DUD	DUDHY		AA	
43	43	SAN VALENTIN	M	M1	M13	M133	M1331	M13311	1	1		2	7	3	243	3	2	2	4	3	4	D	DUD	DUDHY		OC02	
44	44	SAN ISIDRO	M	M1	M13	M133	M1331	M13312	1	1		2	7	4	233	3	1	2	4	3	4	D	DUD	DUDHY		OC02	
45	45	GUAYABO	M	M1	M14	M141		M1411	1	1		2	3f	3	233	3	1	2	2	3	4	D	DUD	DUDHY		AQ06	
46	46	DOS NOVILLOS	M	M2	M21	M211	M2111	M21111	2			2	5	2	221	3	1	2	4	3	2	D	DVI	DVIUD		MO	
47	47	MONTELIMAR	M	M2	M21	M212	M2121	M21211	2			2	8	2	221	3	1	2	4	3	2	D	DVI	DVIUD		AA	
48	48	RIO ROCA	M	M2	M21	M212	M2121	M21212	2			2	8	2	112	3	1	2	4	3	2	D	DVI	DVIUD		LI05	
50	50	RIO SUCIO	M	M2	M21	M213	M2131	M21311	2			2	9	3	221	3	1	2	4	3	2	D	DVI	DVIUD		FL06	
51	51	BOSQUE	M	M3	M31	M311	M3111	M31111	3			2	7	3	241	3	1	1	2	3	2	I	ITR	ITREU		AN02	
52	52	SANTA CLARA	M	M3	M31	M311	M3111	M31112	3			2	7	3	241	3	1	2	2	3	3	I	ITR	ITREU		AN02	
53	53	LA LUCHA	M	M3	M31	M311	M3112	M31121	3			2	8	2	221	3	1	1	1	3	2	I	ITR	ITREU		AN10	
54	54	DESTIERRO	M	M3	M32	M321	M3211	M32111	3			2	7	3	232	3	1	2	3	3	3	I	ITR	ITREU		AN	
55	55	SARDINA	M	M3	M32	M321	M3212	M32121	3			2	8	3	222	3	1	1	3	3	2	I	ITR	ITREU	ITRDY	AN	AN
56	56	RIO PARISMINA	M	M3	M32	M321	M3212	M32122	3			2	9	3	222	3	1	1	3	3	2	I	ITR	ITREU		AN12	
57	57	SUERRE	M	M3	M32	M322	M3221	M32211	3			2	8	3	234	3	1	2	3	3	3	I	ITR	ITREU		AN	
58	58	COPE MALANGA	M	M4	M41	M411	M4111	M41111	5			2	7	3	353	3	1	2	1	3	3	I	IAQ	IAQTR		AA	
59	59	ZENT	M	M4	M42	M421		M4211	5			2	9	3	221	3	1	1	4	3	2	I	ITR	ITREU		FL06	
60	60	LIGIA	M	M4	M42	M421		M4212	5			2	7	3	241	3	1	2	3	3	3	I	ITR	ITRDY		AA	
61	61	PERLA	M	M4	M42	M421		M4213	5			2	7	3	222	3	1	1	3	3	2	I	ITR	ITREU		FL06	
62	62	MATAS DE COSTA RICA	M	M4	M42	M422		M4221	5			2	5	3	232	3	1	1	4	3	3	M	MUD	MUDHA		AA	
63	63	PORTETE	M	M4	M42	M422		M4222	5			2	5	3	353	2	1	1	4	3	3	M	MUD	MUDAR		OX	
64	64	LIQUIDO	P	P1	P11			P111	5		2	0		1	353	3	1	1	0	3	1	E	EAQ	EAQHY		HI	
65	65	BARRO-1	P	P1	P12			P121	5			0	8	1	353	3	1	1	0	3	1	E	EAQ	EAQHY		AA	
66	66	BARRO-2	P	P1	P12			P122	5			1	8	1	353	3	1	1	0	3	1	E	EAQ	EAQHY		HA02	
67	67	AGUA FRIA	P	P2	P21			P211	5			2	8	1	353	3	1	2	0	3	1	E	EAQ	EAQTR		AA	
68	68	SAN RAFAEL	P	P3	P31			P311	5			2	8	1	111	3	1	1	5	1	1	E	EPS	EPSTR		AA	
69	69	BARRA	P	P3	P31			P312	5			2	8	1	111	3	1	2	2	1	1	E	EAQ	EAQPS		AA	
70	70	GAVILAN	P	P3	P31			P313	5		2	2		1	111	3	2	2	0	3	1	E	EAQ	EAQPS		HI	
71	71	QUEBRADA CASPAR	P	P3	P31			P314	5			2	8	1	112	3	1	2	1	3	1	E	EAQ	EAQPS		AA	
72	72	FLORES-1	P	P3	P32			P321	5			2	8	1	112	3	1	1	4	3	1	E	EFL	EFLTR		AN	
73	73	FLORES-2	P	P3	P32			P322	5			2	8	1	112	3	1	1	4	3	1	E	EFL	EFLTR		AA	
74	74	CAHUITA	P	P3	P33			P331	5			2	5	2	112	3	1	2	4	3	1	I	ITR	ITRDY		LI0	

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REC	SU-ID	SU-NM	SK1	SK2	SK3	SK4	SK5	SK6	SP1	SP2	SP3	SP4	SP5	SP6	SP7	SP8	SP9	SP10	SP11	SP12	SP13	ST1	ST2	ST3-P1	ST3-P2	ST4-P1	ST4-P2
1	1	CANO BRAVO	A	A1	A11			A111	5		1	0		5	0	3	2	2	0	3	1	H	HFI	HFITR			
2	2	CANO NEGRO	A	A1	A11			A112	5		1	0		5	0	3	3	2	0	2	1	H	HFI	HFITR			
3	3	CANO MORENO	A	A2	A21			A211	5		1	0		5	0	3	2	2	0	3	1	H	HHE	HHETR			
4	4	LAGUNILLAS	F	F1	F11	F111		F1111	4			2	7	3	241	3	2	2	4	3	5	I	ITR	ITRHU		AN	
5	5	GUAYACAN	F	F1	F11	F111		F1112	4			2	7	3	243	3	2	2	4	2	6	I	ITR	ITRHU		AN	
6	6	LOMAS DE SIERPE	F	F1	F11	F112		F1121	4			2	7	3	353	3	2	2	4	3	6	I	ITR	ITRHU		AN	
7	7	MILANO	F	F1	F11	F112		F1122	4			2	8	3	241	3	2	2	4	3	6	I	ITR	ITRHU		AN	
8	8	LA ALDEA	F	F1	F11	F112		F1123	4			2	7	4	353	3	2	2	4	3	6	I	ITR	ITRHU		AN	
9	9	HUACAS	F	F1	F11	F112		F1124	4			2	7	4	353	3	2	2	4	2	7	I	ITR	ITRHU		AN	
10	10	COCORI	F	F1	F11	F113		F1131	4			2	8	4	353	3	2	2	4	3	7	I	ITR	ITRHU		AN	
11	11	NEGUEV	F	F1	F11	F113		F1132	4			2	7	4	353	3	3	2	4	2	7	I	ITR	ITRHU		AN	
12	12	HUETAR	F	F1	F11	F113		F1133	4			2	7	4	353	3	2	2	4	2	6	I	ITR	ITRHU		AN	
13	13	RIO PACUARE	F	F1	F11	F113		F1134	1			2	8	4	353	3	2	2	4	2	7	I	ITR	ITRHU		AN	
14	14	BARBILLA	F	F1	F11	F113		F1135	4			2	7	4	353	2	1	2	4	2	7	I	ITR	ITRHU		AN	
15	15	LA RAMBLA	F	F1	F11	F113		F1136	4			2	7	4	353	3	3	2	4	2	7	I	ITR	ITRHU		AN	
16	16	CIMARRONES	F	F1	F11	F113		F1137	4			2	8	5	353	2	1	2	4	2	7	I	ITR	ITRHU		AN	
17	17	LA CABANA	F	F1	F11	F114		F1141	4			2	8	5	353	2	2	2	4	2	8	I	ITR	ITRDY		AN25	
18	18	PRECIPICIO	F	F1	F11	F114		F1142	4			2	8	5	353	2	2	2	4	2	8	I	ITR	ITRDY		AN25	
19	19	SILENCIO	F	F1	F11	F114		F1143	4			2	8	5	353	2	2	2	4	2	8	I	ITR	ITRDY		AN25	
20	20	LIMON	F	F1	F11	F115		F1151	5			2	8	4	353	2	2	2	4	1	7	I	ITR	ITRDY		OX	
21	21	RIO CAMARON	F	F1	F12	F121		F1211	4			2	8	5	353	3	2	2	2	2	7	I	ITR	ITRHU		AQ06	
22	22	RIO MOLINO	M	M1	M11			M111	3			2	7	3	241	3	1	2	2	3	3	D	DUD	DUDHA		AQ19	
23	23	CORINTO	M	M1	M12	M121	M1211	M12111	1			2	2d	3	232	3	1	2	4	1	4	D	DUD	DUDME		PA	
24	24	RIO CRISTINA	M	M1	M12	M121	M1211	M12112	1			2	4d	3	233	3	1	2	4	3	4	D	DUD	DUDFU	DUDHA	PA	PA
25	25	CARTAGENA	M	M1	M12	M121	M1211	M12113	1			2	4d	3	221	3	1	2	4	3	4	D	DUD	DUDHA	DUDFU	PA	PA
26	26	LAS DELICIAS	M	M1	M12	M121	M1211	M12114	1			2	4d	3	213	3	1	2	4	3	4	D	DUD	DUDFU		PA	
27	27	MERCEDES	M	M1	M12	M121	M1211	M12115	1			2	4d	4	243	3	1	2	4	3	5	D	DUD	DUDHA		PA	
28	28	LOS DIAMANTES	M	M1	M12	M122	M1221	M12211	1			2	3d	3	232	3	1	2	4	3	3	D	DUD	DUDHA		EU	
29	29	BELLA VISTA	M	M1	M12	M122	M1221	M12212	1			2	3d	3	233	3	1	2	3	3	3	D	DUD	DUDHA		EU	
30	30	CHIRRIPO	M	M1	M12	M122	M1222	M12221	1			2	5	3	233	3	2	2	3	3	4	D	DUD	DUDHA		AA	
31	31	HORQUETAS	M	M1	M12	M123	M1231	M12311	1			2	5	3	233	3	1	2	3	3	3	D	DUD	DUDHA		EU	
32	32	RIO FRIO	M	M1	M12	M123	M1231	M12312	1			2	8	3	221	3	1	2	4	3	3	D	DUD	DUDHA		EU	
33	33	TORTUGUERO	M	M1	M12	M123	M1231	M12313	1			2	8	3	233	3	1	2	4	1	3	D	DUD	DUDHA		AC10	
34	34	IRAZU	M	M1	M12	M123	M1231	M12314	1			2	8	1	221	3	1	2	4	3	3	D	DUD	DUDHA		EU	
35	35	RIO ROCA VARIANTE ALUVIAL	M	M1	M12	M123	M1231	M12315	1	2		2	8	3	232	3	1	2	4	3	3	D	DUD	DUDHA		EU	
36	36	BARRANCA	M	M1	M12	M123	M1232	M12321	1	2		2	8	3	233	3	2	2	4	3	4	D	DUD	DUDHA		AA	
37	37	JIMENEZ	M	M1	M12	M123	M1232	M12322	1			2	8	3	241	3	2	2	4	3	5	D	DUD	DUDHA		AA	
38	38	ALEGRIA	M	M1	M12	M123	M1232	M12323	1			2	7	3	243	3	2	2	4	3	5	D	DUD	DUDHA		AA	
39	39	SANTA TERESITA	M	M1	M12	M123	M1232	M12324	1			2	8	4	243	3	2	2	4	3	4	D	DUD	DUDHA		AA	
40	40	IROQUOIS	M	M1	M12	M123	M1232	M12325	1			2	7	3	243	3	2	2	4	3	5	D	DUD	DUDHA		AA	

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REC	TU-ID	CU-E1	CU-E2	CU-E3	CU-FL	CUP-E1	CUP-E2	LUTSU1	LUTSU2	NU-C1	NU-C2	AG-C12	OX-C12	LA-C12	ER-C1	ER-C2	LSU-C1	LSU-C2
1	1	10	10	0	d1d2	10	10	5	52	1	1	2	4	1	1	1	4	4
2	2	10	10	0	d1d2	10	10	5	52	1	1	2	4	1	1	1	4	4
3	3	10	10	0	d1d2	10	10	5	52	1	1	2	4	1	1	1	4	4
4	4	0	0	0				0	0	0	0	0	0	0	0	0	0	0
5	5	0	0	0				0	0	0	0	0	0	0	0	0	0	0
6	6	10	10	0	d1d2	10	10	5	52	1	1	4	4	1	1	1	4	4
7	7	10	10	0	d1d2	10	10	5	52	1	1	4	4	1	1	1	4	4
8	8	10	10	0	d1d2	10	10	5	52	1	1	4	4	1	1	1	4	4
9	9	10	10	0	d1d2	6s1	6s1	5	52	1	1	4	4	1	1	1	4	4
10	10	10	10	0	s1s2	10	10	4	42	1	1	4	1	1	1	1	4	4
11	11	10	10	0	s1s2	10	10	4	42	1	1	4	3	1	1	1	4	4
12	12	10	10	0	d1d2	10	10	5	52	1	1	4	4	1	1	1	4	4
13	13	6	6	0	s1	6	6	4	42	1	1	4	1	1	1	1	4	4
14	14	6	6	0	s1	6	6	4	42	1	1	4	1	1	1	1	4	4
15	15	9	9	0	e1s1	9	9	5	53	1	1	4	1	1	3	3	4	4
16	17	2	2	0	s4	2	2	1	13	2	1	1	1	1	1	1	2	1
17	18	2	2	0	s4	2	2	1	11	2	1	1	1	1	1	1	2	1
18	19	2	1	0	c	2	1	1	11	2	1	1	1	1	1	1	2	1
19	20	3	3	0	s4	3	3	1	14	2	1	2	1	1	3	2	3	2
20	21	2	2	0	s1	2	2	1	11	1	1	1	1	1	1	1	1	1
21	22	6	6	0	s4	6	6	1	13	1	1	1	2	2	2	1	2	2
22	23	4	4	0	s3	4	4	1	13	2	1	1	2	1	2	1	2	2
23	25	3	3	0	s1	3	3	1	12	1	1	1	2	1	1	1	2	2
24	26	2	2	0	s1	2	2	1	11	1	1	1	1	1	1	1	1	1
25	29	3	3	0	s1s4	3	3	1	13	1	1	1	1	1	1	1	1	1
26	30	10	10	10	e1	10	10	5	51	2	1	1	1	1	4	4	4	4
27	31	4	6	0	s3	4	6	2	24	3	2	1	1	1	3	2	3	2
28	32	3	4	0	s3	3	4	2	21	3	2	1	1	1	2	1	3	2
29	33	9	9	0	e1	9	9	5	51	2	1	1	1	1	4	4	4	4
30	34	9	0	10	e1	9		5	51	2	1	1	2	1	4	4	4	4
31	35	9	0	10	e1	9		5	51	2	1	1	1	1	4	4	4	4
32	36	9	0	10	e1	9		5	51	2	1	1	1	1	3	2	3	2
33	37	4	0	4	e1	4		1	14	2	1	1	3	1	2	1	3	3
34	38	6	0	10	d1	6		1	12	2	1	1	1	1	1	1	2	2
35	39	3	3	0	s1	3	3	1	11	1	1	2	1	1	1	1	2	2
36	40	3	3	0	s1	3	3	1	11	1	1	2	1	1	1	1	1	1
37	42	2	2	0	c	2	2	1	11	1	1	1	1	1	1	1	2	1
38	43	6	6	0	d1	2c	2c	1	12	1	1	1	3	1	1	1	3	3
39	44	9	9	0	d1	3s1	3s1	1	12	1	1	2	4	1	1	1	4	4
40	46	3	3	0	d1	2c	2c	1	12	1	1	1	2	1	1	1	2	2
41	47	3	3	0	s1	3	3	1	12	1	1	1	2	1	1	1	2	2
42	48	6	6	0	s4	6	6	1	13	1	1	1	2	2	2	1	2	2
43	49	9	9	0	d1	3s2	3s2	1	12	1	1	1	4	1	1	1	4	4
44	54	3	3	0	s1	3	3	1	11	1	1	1	1	1	1	1	1	1
45	55	3	3	0	s2d1	3	3	1	12	1	1	1	2	1	1	1	2	2
46	56	4	4	0	e1	4	4	2	24	3	2	1	1	1	3	2	3	2
47	57	10	9	0	e1	10	9	5	51	3	2	1	1	1	4	4	4	4
48	58	4	4	0	s3	4	4	2	21	3	2	1	1	1	2	1	3	2
49	59	7	8	0	s3e1	7	8	3	34	4	2	1	1	1	4	3	4	3
50	60	9	9	0	s3	9	9	3	34	4	2	1	1	1	4	3	4	3

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REC	TU-ID	CU-E1	CU-E2	CU-E3	CU-FL	CUP-E1	CUP-E2	LUTSU1	LUTSU2	NU-C1	NU-C2	AG-C12	OX-C12	LA-C12	ER-C1	ER-C2	LSU-C1	LSU-C2
51	61	8	9	0	s3	8	9	3	34	4	3	1	1	1	4	3	4	3
52	62	8	9	0	s3	8	9	3	34	4	3	1	1	1	3	2	4	3
53	63	9	9	0	e1s3	9	9	5	51	4	3	1	1	1	4	4	4	4
54	64	9	9	0	d1s3	8s3	9	3	32	4	2	1	3	1	1	1	4	3
55	69	9	9	0	e1	9	9	5	51	4	2	1	1	1	4	4	4	4
56	70	10	10	0	s1s2	10	10	4	42	1	1	4	1	1	1	1	4	4
57	71	3	3	0	s1	3	3	1	11	1	1	2	1	1	1	1	2	2
58	72	2	2	0	c	2	2	1	11	1	1	1	1	1	1	1	1	1
59	73	10	10	0	d1d2	10	10	5	52	1	1	2	4	1	1	1	4	4
60	74	9	9	0	s3	9	9	3	34	4	3	1	1	1	3	2	4	3
61	75	10	10	0	d1d2	10	10	5	52	1	1	2	4	1	1	1	4	4
62	76	0	0	0				0	0	0	0	0	0	0	0	0	0	0
63	77	4	4	0	s3	4	4	2	21	3	2	1	1	1	2	1	3	2
64	78	10	10	0	s1s2	10	10	5	53	1	1	4	1	1	3	1	4	4
65	79	6	6	0	s1	6	6	4	42	1	1	4	1	1	1	1	4	4
66	80	9	9	0	s3	9	9	3	31	4	2	1	1	1	1	1	4	2
67	81	3	3	0	s4	3	3	1	13	1	1	1	1	1	2	1	2	1
68	82	6	9	0	s3	6	9	2	21	3	2	1	1	1	2	1	3	2
69	83	6	6	0	d1	3s4	3s4	1	12	1	1	1	1	1	1	1	3	3
70	84	2	2	0	s1	2	2	1	11	1	1	1	1	1	1	1	1	1
71	85	6	6	0	d1	2	2	1	12	1	1	1	1	1	1	1	3	3
72	87	3	3	0	s1	4	4	1	11	1	1	2	1	1	1	1	2	2
73	88	4	4	0	s1s4	4	4	1	13	1	1	2	1	1	2	1	2	2
74	89	3	3	0	s4	3	3	1	13	2	1	1	1	1	2	1	2	1
75	90	6	6	0	d1	3d1	3d1	1	12	1	1	1	1	1	1	1	3	3
76	91	2	2	0	s4	2	2	1	11	2	1	1	1	1	1	1	2	1
77	92	3	3	0	s1	3	3	1	11	1	1	2	1	1	1	1	2	2
78	93	2	1	0	c	2	1	2	21	3	2	1	1	1	1	1	3	2
79	94	3	3	0	s1	3	3	1	11	1	1	1	1	1	1	1	1	1
80	95	9	9	0	s3	9	9	3	34	4	2	1	1	1	3	2	4	2
81	96	7	8	0	s2s3	7	8	3	34	4	2	1	1	1	4	3	4	3
82	97	9	9	0	s3	9	9	3	34	4	3	1	1	1	1	1	1	1
83	98	2	2	0	s1	2	2	1	11	1	1	1	1	1	1	1	3	3
84	99	6	6	0	d1	2	2	1	12	1	1	1	1	1	4	3	4	3
85	100	7	8	0	s3e1	7	8	3	34	4	2	1	1	1	2	1	3	2
86	101	4	6	0	s3	4	6	2	21	3	2	1	1	1	2	1	4	4
87	102	6	6	0	s4	6	6	5	53	1	1	4	1	1	3	2	4	4
88	103	10	10	0	e1	10	10	5	51	1	1	4	1	1	4	4	4	4
89	104	6	6	0	d1	6	6	1	13	1	1	1	3	1	2	1	3	3
90	105	4	4	0	s3	4	4	1	12	2	1	1	2	1	2	1	2	2
91	106	3	3	0	s1	3	3	1	12	1	1	1	2	1	2	1	2	2
92	107	6	6	0	s4	6	6	1	13	2	1	1	1	1	2	1	2	2
93	108	8	9	0	s3	8	9	3	31	4	3	1	1	1	4	4	4	3
94	109	9	9	0	e1	9	9	5	51	4	2	1	1	1	3	2	4	4
95	110	7	8	0	s2s3	7	8	3	34	4	2	1	1	1	3	2	3	2
96	111	6	6	0	e1s3	6	6	2	24	3	2	1	1	1	2	1	4	4
97	112	10	9	0	e1	10	9	5	51	3	2	1	1	1	3	1	4	4
98	113	9	9	0	e1	9	9	5	51	2	1	2	1	1	4	4	4	4
99	114	4	4	0	e1	4	4	2	24	3	2	1	1	1	3	2	3	2
100	115	9	9	0	e1	9	9	5	51	3	2	1	1	2	4	4	4	4

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REC	TU-ID	CU-E1	CU-E2	CU-E3	CU-FL	CUP-E1	CUP-E2	LUTSU1	LUTSU2	NU-C1	NU-C2	AG-C12	OX-C12	LA-C12	ER-C1	ER-C2	LSU-C1	LSU-C2
101	117	4	4	0	s3	4	4	2	21	3	2	1	1	1	1	1	3	2
102	118	9	9	0	e1s4	9	9	5	51	3	2	1	1	1	4	4	4	4
103	119	9	9	0	s3	9	9	3	31	4	2	1	1	1	2	1	4	2
104	120	10	10	0	d1d2	10	10	5	52	1	1	2	4	1	1	1	4	4
105	122	10	10	0	d1d2	10	10	5	52	1	1	2	4	1	1	1	4	4
106	123	9	9	0	e1	9	9	5	51	4	3	1	1	1	4	4	4	4
107	124	9	9	0	e1	9	9	5	51	2	1	1	1	1	4	4	4	4
108	125	3	4	0	s3	3	4	2	23	3	2	1	1	1	2	1	3	2
109	126	10	10	0	e1	10	10	5	51	3	2	1	1	2	4	1	3	2
110	128	4	0	4	e1	4		1	14	2	1	1	1	1	4	2	4	4
111	129	9	0	10	e1	9		5	51	2	1	1	1	1	4	4	4	4
112	130	9	0	10	e1	9		5	51	2	1	1	1	3	4	4	4	4
113	131	0	0	10	s1			5	51	1	1	4	1	1	4	4	4	4
114	132	0	0	6	s1			5	51	1	1	4	1	1	1	1	2	2
115	133	2	2	0	s1	2	2	1	12	1	1	1	2	1	1	1	4	4
116	134	9	9	0	d1	3	3	1	12	1	1	1	4	1	1	1	4	4
117	135	9	9	0	d1	3	3	1	12	1	1	1	2	1	1	1	2	2
118	136	3	3	0	s2d1	3	3	1	13	1	1	1	1	1	2	1	2	1
119	137	6	6	0	s4	6	6	1	13	1	1	1	1	1	2	1	2	1
120	138	6	6	0	s4	6	6	1	12	1	1	1	2	1	2	1	4	2
121	139	3	3	0	s1	3	3	1	13	1	1	1	4	1	1	1	4	4
122	140	9	9	0	d1	6s4	6s4	3	34	4	2	1	1	1	4	1	4	3
123	142	8	9	0	s3e1	8	9	2	24	3	2	1	1	1	4	1	4	3
124	143	6	0	0	e1s3	6		5	51	4	2	1	1	1	4	1	4	4
125	144	9	9	0	e1	9	9	5	51	4	2	1	1	1	4	1	4	4
126	145	10	10	0	e1	10	10	5	51	4	2	1	1	1	4	1	4	4
127	146	10	10	0	e1	10	10	3	34	4	2	1	1	1	4	1	4	3
128	147	7	7	0	e1	7	7	5	51	4	2	1	1	1	3	1	4	2
129	148	10	10	0	e1	10	10	3	34	4	2	1	1	1	2	1	4	4
130	149	7	7	0	s2s3	7	7	5	53	1	1	4	1	1	2	1	2	1
131	150	10	10	0	s1s2	10	10	1	11	1	1	1	1	1	4	1	4	3
132	151	3	3	0	s1	3	3	3	34	4	3	1	1	3	1	1	4	4
133	152	8	9	0	s3	8	9	5	53	1	1	4	1	1	4	1	4	3
134	153	10	10	0	s1s2	10	10	3	34	4	2	1	1	1	4	3	4	3
135	159	6	6	0	e1	6	6	3	34	4	2	1	1	1	4	3	4	3
136	160	10	10	0	e1	10	10	1	14	1	1	3	1	1	1	1	3	3
137	161	6	6	0	e1	6	6	4	41	1	1	1	1	1	4	3	4	3
138	162	6	6	0	s1s2	6	6	3	34	4	2	1	1	1	4	4	4	4
139	163	6	6	0	e1s1	6	6	5	51	3	2	1	1	1	4	4	4	4
140	164	10	10	0	e1	10	10	5	51	3	2	1	1	1	4	1	4	4
141	165	10	10	0	e1	10	10	4	42	1	1	4	4	1	1	1	4	4
142	166	10	10	0	d1s1	10	10	5	52	1	1	4	4	1	1	1	4	4
143	167	10	10	0	d1d2	10	10	5	52	1	1	4	4	1	1	1	4	4
144	168	10	10	0	d1d2	6s1	6s1	5	52	1	1	4	4	1	1	1	4	4
145	169	9	9	0	d1	3	3	1	12	1	1	1	4	1	1	1	4	4

DATAFILE NAME: LE-ITEM.DBF

ITEM	DESCR-E
TU-ID	TERRAIN UNIT IDENTIFIER
CU-E1	LAND CAPABILITY CLASS ACCORDING TO TSC (1985) life zone bmh-T
CU-E2	LAND CAPABILITY CLASS ACCORDING TO TSC (1985) life zone bh-T
CU-E3	LAND CAPABILITY CLASS ACCORDING TO TSC (1985) life zone bp-T
CU-FL	LIMITING FACTORS IN LAND CAPABILITY CLASSIFICATION ACCORDING TO TSC (1985)
CUP-E1	POTENTIAL LAND CAPABILITY CLASS life zone bmh-T
CUP-E2	POTENTIAL LAND CAPABILITY CLASS life zone bm-T
LUTSU1	SUITABILITY CLASS FOR MAJOR LANDUSE TYPES
LUTSU2	SUITABILITY SUBCLASS FOR MAJOR LANDUSE TYPES
NU-C1	DEGREE OF SUFFICIENCY OF NUTRIENTS FOR REQUIRING CROPS
NU-C2	DEGREE OF SUFFICIENCY OF NUTRIENTS FOR NON REQUIRING CROPS
AG-C12	DEGREE OF SUFFICIENCY OF WATER FOR REQUIRING AND NON REQUIRING CROPS
OX-C12	DEGREE OF SUFFICIENCY OF OXIGEN FOR REQUIRING AND NON REQUIRING CROPS
LA-C12	DEGREE OF WORKABILITY FOR REQUIRING AND NON REQUIRING CROPS
ER-C1	DEGREE OF RESISTANCE AGAINST EROSION FOR REQUIRING CROPS
ER-C2	DEGREE OF RESISTANCE AGAINST EROSION FOR NON REQUIRING CROPS
LSU-C1	SUITABILITY FOR REQUIRING CROPS EVALUATION NU-C1,AG-C12,OX-C12,LA-C12,ER-C1
LSU-C2	SUITABILITY FOR NON REQUIRING CROPS EVALUATION NU-C2,AG-C12,OX-C12,LA-C12,ER-C2

ITEM	DESCR-S
TU-ID	IDENTIFICATION DE LA UNIDAD DEL TERRENO
CU-E1	CLASE DE CAPICIDAD DE USO SEGUN CCT (1985) zona de vida bmh-T
CU-E2	CLASE DE CAPICIDAD DE USO SEGUN CCT (1985) zona de vida bh-T
CU-E3	CLASE DE CAPICIDAD DE USO SEGUN CCT (1985) zona de vida bp-P
CU-FL	FACTORES LIMITANTES EN LA CLASIFICACION DE LA CAPACIDAD DE USO SEGUN CCT (1985)
CUP-E1	CLASE DE CAPICIDAD DE USO POTENTIAL zona de vida bmh-T
CUP-E2	CLASE DE CAPICIDAD DE USO POTENTIAL zona de vida bh-T
LUTSU1	CLASE DE APTITUD DE LOS SUELOS PARA TIPOS MAYORES DE USO DE LA TIERRA
LUTSU2	SUBCLASE DE APTITUD DE LOS SUELOS PARA TIPOS MAYORES DE USO DE LA TIERRA
NU-C1	GRADO DE SUFICIENCIA DE NUTRIENTES PARA CULTIVOS EXIGENTES
NU-C2	GRADO DE SUFICIENCIA DE NUTRIENTES PARA CULTIVOS NO EXIGENTES
AG-C12	GRADO DE SUFICIENCIA DE AGUA PARA CULTIVOS EXIGENTES Y NO EXIGENTES
OX-C12	GRADO DE SUFICIENCIA DE OXIGENO PARA CULTIVOS EXIGENTES Y NO EXIGENTES
LA-C12	CAPACIDAD DE LABOREO PARA CULTIVOS EXIGENTES Y NO EXIGENTES
ER-C1	GRADO DE RESISTENCIA CONTRA LA EROSION PARA CULTIVOS EXIGENTES
ER-C2	GRADO DE RESISTENCIA CONTRA LA EROSION PARA CULTIVOS NO EXIGENTES
LSU-C1	APTITUD PARA CULTIVOS EXIGENTES EVALUANDO NU-C1,AG-C12,OX-C12,LA-C12,ER-C1
LSU-C2	APTITUD PARA CULTIVOS NO EXIGENTES EVALUADO NU-C2,AG-C12,OX-C12,LA-C12,ER-C2

DATAFILE NAME: TP.DBF

REC	TP	DESCR-E	DESCR-S
1	TP1	PHYSIOGRAPHY	FISIOGRAFIA
2	TP2	GEOLOGY	GEOLOGIA
3	TP3	MAJOR LANDFORM	FORMA DE TERRENO MAYOR
4	TP4	MINOR LANDFORM	FORMA DE TERRENO MINOR
5	TP5	PARENT MATERIAL	MATERIAL DE PARTIDA
6	TP6	SLOPE GRADIENT	GRADO DE PENDIENTE
7	TP7	SUBSTRATUM	SUBSTRATO
8	TP8	SUBSURFACE STONINESS	PEDREGOSIDAD DENTRO DEL PERFIL
9	TP9	SURFACE STONINESS	PEDREGOSIDAD EN LA SUPERFICIE
10	TP10	SOIL	SUELO

DATAFILE NAME: SP.DBF

REC	SP	DESCR-E	DESCR-S
1	SP1	ANDIC PROPERTIES	PROPIEDADES ANDICAS
2	SP2	HYDRIC PROPERTIES	PROPIEDADES HIDRICAS
3	SP3	HISTIC PROPERTIES	PROPIEDADES HISTICAS
4	SP4	N-VALUE	MADUREZ
5	SP5	A-HORIZON	HORIZONTE-A
6	SP6	EFFECTIVE SOIL DEPTH	PROFUNDIDAD EFECTIVA DEL SUELO
7	SP7	TEXTURE	TEXTURA
8	SP8	CATION EXCHANGE CAPACITY (CEC)	CIC (CAP. DE INTERC. DE CAT.)
9	SP9	REACTION CLASS	CLASE DE REACCION
10	SP10	BASE SATURATION (25-100CM)	SATURACION DE BASES (25-100CM)
11	SP11	DRAINAGE CLASS	CLASE DE DRENAJE
12	SP12	ACIDITY CLASS	CLASE DE ACIDEZ
13	SP13	SOIL DEVELOPMENT STAGE	FASE DE DESARROLLO DEL SUELO

DATAFILE NAME: TP1.DBF

REC	TP1	DESCR-E	DESCR-S
1	1	VOLCANIC AREAS	AREAS VOLCANICAS
2	2	FOLD-MOUNTAINS	MONTANAS DE PLEGAMIENTO
3	3	ALLUVIAL AREAS	AREAS ALUVIALES
4	4	LITTORAL AREAS	AREAS LITORALES
5	5	MOORLANDS	AREAS DE TURBERA

DATAFILE NAME: TP2.DBF

REC	TP2	FORMATION	GP1	GP2
1	1	-	1	1
2	2	-	2	1
3	3	-	2	2
4	4	-	3	1
5	5	-	3	2
6	6	-	4	1
7	7	-	4	2
8	8	-	5	1
9	9	-	5	2
10	10	-	5	3-2
11	11	-	6	3-2
12	12	SURETKA	7	3-2
13	13	LIHON	8	4-3
14	14	RIO BANANO	9	6-4
15	15	USCARI	10	9-5

DATAFILE NAME: TP3.DBF

REC	TP3	DESCR-E	DESCR-S
1	1	COMPOSITE CONES	CONOS COMPUESTOS
2	2	VOLCANIC SKELETONS	ESQUELETOS VOLCANICOS
3	3	LAHARS AND LAVA FLOWS	LAHARES Y COLADAS DE LAVA
4	4	CUESTAS	CUESTAS
5	5	EROSION PLATFORMS	PLATAFORMAS DE EROSION
6	6	FANS	ABANICOS
7	7	FLOODPLAINS	LLANURAS DE INUNDACION
8	8	ABBRASION PLATFORMS	PLATAFORMAS DE ABRASION
9	9	BEACH PLAINS	LLANURAS DE PLAYA
10	10	BOGS	PANTANOS

DATAFILE NAME: TP4.DBF

REC	TP4	DESCR-E	DESCR-S
1	1	INTERFLUVE OR VALLEY SLOPES	VERTIENTES DE INTERFLUVIO O VALLE
2	2	VALLEY FLOORS	FONDOS DE VALLE
3	3	INTERFLUVE FLATS	PLATAFORMAS DE INTERFLUVIO
4	4	TERRACE FLATS	PLATAFORMAS DE TERRAZA
5	5	TERRACE SLOPES	VERTIENTES DE TERRAZA
6	6	ABANDONED CHANNELS	CAUCES ABANDONADOS
7	7	CREVASSE SPLAYS	EXPLAYAMIENTOS DE ABERTURA
8	8	FLOOD BASINS	DEPRESIONES LATERALES
9	9	BEACH RIDGES	CRESTAS DE PLAYA
10	10	SWALES	CORREDORES
11	11	NATURAL LEVEES	DIQUES NATURALES
12	12	FLOOD-BASIN BOGS	PANTANOS DE DEPRESION LATERAL
13	13	VALLEY BOGS	PANTANOS DE VALLE
14	14	SWALE BOGS	PANTANOS DE CORREDOR
15	15	LAKES	LAGUNAS

DATAFILE NAME: TP5.DBF

REC	TP5	DESCR-E	DESCR-S
1	1	VOLCANIC ASH	CENIZA VOLCANICA
2	2	VOLCANIC ASH OVER LAVA	CENIZA VOLCANICA SOBRE LAVA
3	3	LAVA ENRICHED BY VOLCANIC ASH	LAVA ENRIQUECIDA CON CENIZA VOLCANICA
4	4	LAVA AND VOLCANIC ASH	LAVA Y CENIZA VOLCANICA
5	5	BRECCIATED LAVA	LAVA BRECHADA
6	6	LAVA	LAVA
7	7	SAPROLITHIC LAVA	LAVA SAPROLITICA
8	8	DESINTERGRATED LAVA	LAVA DESAGREGADA
9	9	CEMENTED BRECCIATED LAVA OR LAHAR	LAVA BRECHADA CEMENTADA O LAHAR
10	10	VOLCANIC CONGLOMERATE	CONGLOMERADO VOLCANICO
11	11	CORAL LIMESTONE	CALIZA DE CORALES
12	12	MONTHORILLONITIC CLAY	ARCILLA MONTHORILONITICA
13	13	VOLCANIC SAND- AND SILTSTONE	ARENISCA Y LIMOLITA VOLCANICA
14	14	VOLCANIC SILTSTONE	LIMOLITA VOLCANICA
15	15	BOULDERY LAHAR	LAHAR CON PEDREGONES
16	16	STONY LAHAR	LAHAR PEDREGOSO
17	17	SANDY LAHAR	LAHAR ARENOSO
18	18	BOULDERY SAND OF VOLCANIC ORIGIN	ARENA CON PEDREGONES DE ORIGEN VOLCANICO
19	19	STONY SAND OF VOLCANIC ORIGIN	ARENA PEDREGOSA DE ORIGEN VOLCANICO
20	20	SAND OF VOLCANIC ORIGIN	ARENA DE ORIGEN VOLCANICO
21	21	FINE SAND AND SILT OF VOLCANIC ORIGIN	ARENA FINA Y LIMO DE ORIGEN VOLCANICO
22	22	SILT AND CLAY OF VOLCANIC ORIGIN	LIMO Y ARCILLA DE ORIGEN VOLCANICO
23	23	STONY SAND OF VARIABLE ORIGIN	ARENA PEDREGOSA
24	24	SAND OF VARIABLE ORIGIN	ARENA DE ORIGEN VARIABLE
25	25	SILT AND CLAY OF VARIABLE ORIGIN	LIMO Y ARCILLA DE ORIGEN VARIABLE
26	26	FINE SAND AND SILT OF VARIABLE ORIGIN	ARENA FINA Y LIMO DE ORIGEN VARIABLE
27	27	EUTROPHIC PEAT	TURBA EUTROPICA
28	28	OLIGOTROPHIC PEAT	TURBA OLIGOTROPICA
29	29	MUD OF VARIABLE ORIGIN	FANGO DE ORIGEN VARIABLE
30	30	CALCAREOUS SANDSTONE	ARENISCA CALCAREA

DATAFILE NAME: TP6.DBF

REC	TP6	CLASS	DESCR-E	DESCR-S
1	1	(0) - (1-3) %	LEVEL OR ALMOST LEVEL	LLANO O CASI LLANO
2	2	(1-3) - (5-8) %	GENTLY SLOPING	SUAVEMENTE INCLINADO
3	3	(5-8) - (10-16) %	SLOPING	INCLINADO
4	4	(10-16) - (20-30) %	MODERATELY STEEP	MODERADAMENTE ESCARPADO
5	5	(20-30) - (45-65) %	STEEP	ESCARPADO
6	6	(45-65) - (120-160) %	VERY STEEP	MUY ESCARPADO

DATAFILE NAME: TP7.DBF

REC	TP7	DESCR-E	DESCR-S
1	1	LITHIC	LITICO
2	2	PARALITHIC	PARALITICO
3	3	SAPROLITHIC	SAPROLITICO
4	4	UNCONSOLIDATED (permeable, loose material)	NO CONSOLIDADO (permeable, material suelto)

DATAFILE NAME: TP8.DBF

REC	TP8	CLASS	DESCR-E	DESCR-S
1	0	< 2 %	NO STONES OR VERY FEW STONES	SIN O CON MUY POCAS PIEDRAS
2	1	2 - 12 %	COMMON STONES	FRECUENTES PIEDRAS
3	2	15 - 50 %	MANY STONES	MUCHAS PIEDRAS
4	3	50 - 90 %	ABUNDANT STONES	ABUNDANTES PIEDRAS
5	4	> 90 %	DOMINANT STONES	DOMINANTES PIEDRAS

DATAFILE NAME: TP9.DBF

REC	TP9	CLASS	DESCR-E	DESCR-S
1	0	< 0.01 %	NO STONES OR VERY FEW STONES	SIN PIEDRAS O CON MUY POCAS
2	1	0.01 - 0.1 %	MODERATELY STONY	MODERADAMENTE PEDREGOSO
3	2	0.1 - 3 %	STONY	PEDREGOSO
4	3	3 - 15 %	VERY STONY	MUY PEDREGOSO
5	4	15 - 90 %	EXCESIVELY STONY	EXCESIVAMENTE PEDREGOSO
6	5	> 90 %	PAVED WITH STONES	TERRENO RIPIOSO

DATAFILE NAME: GP1.DBF

REC	GP1	DESCR-E	DESCR-S
1	1	PEAT DEPOSITS	DEPOSITOS DE TURBA
2	2	BEACH DEPOSITS	DEPOSITOS DE PLAYA
3	3	FLUVIAL DEPOSITS	DEPOSITOS FLUVIALES
4	4	FLUVIO-LAHARIC DEPOSITS	DEPOSITOS FLUVIO-LAHARICOS
5	5	ANDESITIC VOLCANIC ROCKS	ROCAS ANDESITICAS VOLCANICAS
6	6	BASALTIC VOLCANIC ROCKS	ROCAS BASALTICAS VOLCANICAS
7	7	CONGLOMERATES	CONGLOMERADOS
8	8	CORAL LIMESTONES	CALIZAS CORALINAS
9	9	SANDSTONES	ARENISCAS
10	10	MUDSTONES	LUTITAS

DATAFILE NAME: GP2.DBF

REC	GP2	DESCR-E	DESCR-S
1	1	HOLOCENE	HOLOCENO
2	2	PLEISTOCENE	PLEISTOCENO
3	3-2	PLIO-PLEISTOCENE	PLIO-PLEISTOCENO
4	4-3	PLIOCENE	PLIOCENO
5	6-4	MIO-PLIOCENE	MIO-PLIOCENO
6	9-5	MIOCENE	MIOCENO

DATAFILE NAME: SP1.DBF

REC	SP1	DESCR-E	DESCR-S
1	1	MEETS ALL REQUIREMENTS	CUMPLE CON TODOS LOS REQUISITOS
2	2	(PSEUDO) VITRIC PROPERTIES	PROPIEDADES PSEUDO VITRICAS
3	3	ANDIC SUBGROUP, NON KANDIC	SUBGRUPO ANDICO, NO KANDICO
4	4	ANDIC SUBGROUP, KANDIC	SUBGRUPO ANDICO, KANDICO
5	5	DOES NOT MEET REQUIREMENTS	NO CUMPLE CON LOS REQUISITOS

DATAFILE NAME: SP2.DBF

REC	SP2	DESCR-E	DESCR-S
1	1	> 100% WATER AT 15 BAR	> 100% AGUA A 15 ATM
2	2	70 - 100% WATER AT 15 BAR	70 - 100% AGUA A 15 ATM

DATAFILE NAME: SP3.DBF

REC	SP3	DESCR-E	DESCR-S
1	1	MEETS REQUIREMENTS OF HISTOSOLS	CUMPLE LOS REQUISITOS DE HISTOSOLS
2	1	WITH A HISTIC EPIPEDON	CON UN HISTIC EPIPEDON

DATAFILE NAME: SP4.DBF

REC	SP4	DESCR-E	DESCR-S
1	0	N-VALUE > 1.0	VALOR-N > 1.0
2	1	N-VALUE 0.7 - 1.0	VALOR-N 0.7 - 1.0
3	2	N-VALUE < 0.7	VALOR-N < 0.7

DATAFILE NAME: SP5.DBF

REC	SP5	DESCR-E			DESCR-S		
		COLOR	DEPTH cm	O.M.	COLOR	PROF. cm	M.O.
1	1F	MELANIC	30 - 60	> 11.15 %	MELANIC	30 - 60	> 11.15 %
2	2F	PACHIC MELANIC	> 60	> 9.35 %	PACHIC MELANIC	> 60	> 9.35 %
3	3F	FULVIC	30 - 60	> 11.15 %	FULVIC	30 - 60	> 11.15 %
4	4F	PACHIC FULVIC	> 60	> 9.35 %	PACHIC FULVIC	> 60	> 9.35 %
5	1D	WEAK MELANIC	30 - 60	6 - 11.15 %	DEBIL MELANIC	30 - 60	6 - 11.15 %
6	2D	PACHIC WEAK MELANIC	> 60	6 - 9.35 %	PACHIC DEBIL MELANIC	> 60	6 - 9.35 %
7	3D	WEAK FULVIC	30 - 60	6 - 11.15 %	DEBIL FULVIC	30 - 60	6 - 11.15 %
8	4D	PACHIC WEAK FULVIC	> 60	5 - 9.35 %	PACHIC DEBIL FULVIC	> 60	5 - 9.35 %
9	5	MOLLIC / UMBRIC	30 - 60	1.8 - 6 %	MOLLIC / UMBRIC	30 - 60	1.8 - 6 %
10	6	PACHIC MOLLIC / UMBRIC	> 60	1.8 - 5 %	PACHIC MOLLIC / UMBRIC	> 60	1.8 - 5 %
11	7	HUMIC	-	> 2 kg/m3	HUMIC	-	> 2 kg/m3
12	8	OCHRIC	-	< 2 kg/m3	OCHRIC	-	< 2 kg/m3
13	9	OCHRIC, FLUVENTIC	-	-	OCHRIC, FLUVENTIC	-	-

DATAFILE NAME:SP6.DBF

REC	SP6	SP6-CL	DESCR-E	DESCR-S
1	1	0 - (10-25) cm	VERY SHALLOW	SUPERFICIAL
2	2	(19-25) - (50-75) cm	SHALLOW	POCO PROFUNDO
3	3	(50-75) - (100-125) cm	MODERATELY DEEP	MODERADAMENTE
4	4	(100-125) - (200-225) cm	DEEP	PROFUNDO
5	5	> (200-225) cm	VERY DEEP	MUY PROFUNDO

DATAFILE NAME: SP7.DBF

REC	SP7	DESCR-E	DESCR-S
1	111	SANDY	ARENOSO
2	112	LOAMY SAND	ARENO FRANCOSO
3	221	SANDY LOAM	FRANCO ARENOSO
4	222	FINE SANDY LOAM	FRANCO ARENOSO FINO
5	231	VERY FINE SANDY LOAM	FRANCO ARENOSO MUY FINO
6	232	LOAM	FRANCO
7	233	SILTY LOAM	FRANCO LIMOSO
8	234	SILT	LIMOSO
9	241	CLAY LOAM	FRANCO ARCILLOSO
10	242	SANDY CLAY LOAM	FRANCO ARCILLO ARENOSO
11	243	SILTY CLAY LOAM	FRANCO ARCILLO LIMOSO
12	351	SANDY CLAY	ARCILLA ARENOSA
13	352	SILTY CLAY	ARCILLA LIMOSA
14	353	CLAY	ARCILLA

DATAFILE NAME: SP8.DBF

REC	SP8	DESCR-E	DESCR-S
1	1	CEC <= 16 meq/100 g. clay or ECEC <= 12 meq	CIC <= 16 meq/100 g. arcilla o ECIC <= 12 meq
2	2	CEC 16 - 24 meq/100 g. clay	CIC 16 - 24 meq/100 g. arcilla
3	3	CEC > 24 meq/100 g. clay	CIC > 24 meq/100 g. arcilla

DATAFILE NAME: SP9.DBF

REC	SP9	DESCR-E	DESCR-S
1	1	NON ACID (pH-KCL > 4.8, pH-H20 > 5.5)	NO ACIDO (pH-KCL > 4.8, pH-H20 > 5.5)
2	2	ACID (pH-KCL < 4.8, pH-H20 4.5 - 5.5)	ACIDO (pH-KCL < 4.8, pH-H20 4.5 - 5.5)
3	3	VERY ACID (pH-H20 < 4.5)	MUY ACIDO (pH-H20 < 4.5)

DATAFILE NAME: SP10.DBF

REC	SP10	DESCR-E	DESCR-S
1	1	BASE SATURATION > 50 % (between 25-100 cm)	SATURACION DE BASE > 50% (entre 25-100 cm)
2	2	BASE SATURATION < 50 % (between 25-100 cm)	SATURACION DE BASE < 50% (entre 25-100 cm)

DATAFILE NAME: SP11.DBF

REC	SP11	DESCR-E	DESCR-S
1	0	VERY POORLY DRAINED	MUY ESCASAMENTE DRENADO
2	1	POORLY DRAINED	ESCASAMENTE DRENADO
3	2	IMPERFECTLY DRAINED	IMPERFECTAMENTE DRENADO
4	3	MODERATELY WELL DRAINED	MODERADAMENTE BIEN DRENADO
5	4	WELL DRAINED	BIEN DRENADO
6	5	SOMEWHAT EXCESSIVELY DRAINED	ALGO EXCESIVAMENTE DRENADO

DATAFILE NAME: SP12.DBF

REC	SP12	DESCR-E	DESCR-S
1	1	ECEC < 2 meq/100 g soil	ECIC < 2 meq/100 g suelo
2	2	ECEC > 2 meq KCL extractable AL+H/100 g soil	ECIC > 2 meq AL+H/100 g suelo extraible con KCL
3	3	ECEC > 2 meq/100 g sl AND < 2 meq KCL ex. AL+H/100 g sl	ECIC > 2 meq/100 g sl Y < 2 meq AL+H/100 g sl ex. KCL

DATAFILE NAME: SP13.DBF

REC	SP13	DESCR-E	DESCR-S
1	1	NOT OR VERY SLIGHTLY DEVELOPED	SIN O CON MUY POCO DESARROLLO
2	2	SLIGHTLY DEVELOPED	CON POCO DESARROLLO
3	3	MODERATELY DEVELOPED	MODERADAMENTE DESARROLLADO
4	4	WELL DEVELOPED	BIEN DESARROLLADO
5	5	WELL DEVELOPED, SLIGHTLY LEACHED	BIEN DESARROLLADO, POCO LIXIVIADO
6	6	WELL DEVELOPED, MODERATELY LEACHED	BIEN DESARROLLADO, MODERADAMENTE LIXIVIADO
7	7	STRONGLY DEVELOPED, LEACHED	MUY DESARROLLADO, LIXIVIADO
8	8	STRONGLY DEVELOPED, STRONGLY LEACHED	MUY DESARROLLADO, FUERTEMENTE LIXIVIADO

DATAFILE NAME: NU-C1.TXT

NU-C1	DESCR-E	DESCR-S	SP13
1	HIGH	ALTO	1,2,3
2	MODERATELY HIGH	MODERADAMENTE ALTO	4
3	MODERATE	MODERADO	5,6
4	INSUFFICIENT	INSUFICIENTE	7,8

DATAFILE NAME: NU-C2.TXT

NU-C2	DESCR-E	DESCR-S	SP13
1	HIGH	ALTO	1,2,3,4
2	MODERATELY HIGH	MODERADAMENTE ALTO	5,6
3	MODERATE	MODERADO	7,8
4	INSUFFICIENT	INSUFICIENTE	> 8

DATAFILE NAME: LA-C12.DBF

LA-C12	DESCR-E	DESCR-S	TP9
1	HIGH	ALTA	0,1,2
2	MODERATELY HIGH	MODERADAMENTE ALTA	3
3	MODERATE	MODERADA	4
4	INSUFICIENT	INSUFICIENTE	5

DATAFILE NAME: AG-C12.DBF

AG-C12	DESCR-E	DESCR-S	SP6	SP7	TP8
1	HIGH	ALTO	>= 3	>= 221	< 3
2	MODERATELY HIGH	MODERADAMENTE ALTO	>= 3	>= 112, < 221	< 3
2	MODERATELY HIGH	MODERADAMENTE ALTO	2	>= 221	< 3
3	MODERATE	MODERADO	2	>= 112, < 221	< 3
4	INSUFFICIENT	INSUFICIENTE	2	>= 112, < 221	> 2
4	INSUFFICIENT	INSUFICIENTE	1	-	> 2

DATAFILE NAME: OX-C12.DBF

OX-C12	DESCR-E	DESCR-S	SP11
1	HIGH	ALTO	4,5
2	MODERATELY HIGH	MODERADAMENTE ALTO	3
3	MODERATE	MODERADO	2
4	INSUFFICIENT	INSUFICIENTE	0,1

DATAFILE NAME: ER-C1.DBF

ER-C1	DESCR-E	DESCR-S	TP6
1	HIGH	ALTO	1
2	MODERATELY HIGH	MODERADAMENTE ALTO	2
3	MODERATE	MODERADO	3
4	INSUFFICIENT	INSUFICIENTE	> 3

DATAFILE NAME: ER-C2.DBF

ER-C2	DESCR-E	DESCR-S	TP6
1	HIGH	ALTO	1,2
2	MODERATELY HIGH	MODERADAMENTE ALTO	3
3	MODERATE	MODERADO	4
4	INSUFFICIENT	INSUFICIENTE	> 4

DATAFILE NAME: LSU-CX.DBF

LSU-C1 (-C2)	DESCR-E	DESCR-S
1	VERY SUITABLE	MUY APTA
2	SUITABLE	APTA
3	MODERATELY SUITABLE	MODERADAMENTE APTA
4	NOT SUITABLE	NO APTA

DATAFILE NAME: ST.DBF

REC	ST	DESCR-E
1	ST1	SOIL TAXONOMY FIRST LEVEL: ORDER
2	ST2	SOIL TAXONOMY SECOND LEVEL: SUBORDER
3	ST3-P1	SOIL TAXONOMY THIRD LEVEL: GREAT GROUP (possibility one)
4	ST3-P2	SOIL TAXONOMY THIRD LEVEL: GREAT GROUP (possibility two)
5	ST4-P1	SOIL TAXONOMY FOURTH LEVEL: SUB GROUP (possibility one)
6	ST4-P2	SOIL TAXONOMY FOURTH LEVEL: SUB GROUP (possibility two)

DATAFILE NAME: ST1.DBF

REC	ST1-CL	ST-NM
1	D	ANDISOLS
2	E	ENTISOLS
3	H	HISTOSOLS
4	I	INCEPTISOLS
5	M	MOLLISOLS

DATAFILE NAME: ST2.DBF

REC	ST2-CL	ST2-NM
1	DUD	UDANDS
2	DVI	VITRANDS
3	EAQ	AQUENTS
4	EFL	FLUVENTS
5	HFI	FIBRISTS
6	HHE	HEMISTS
7	IAQ	AQUEPTS
8	ITR	TROPEPTS
9	MUD	UDOLLS

DATAFILE NAME: ST3.DBF

REC	ST1-CL	ST-NM
1	DUDFU	FULVUDANDS
2	DUDHA	HAPLUDANDS
3	DUDHY	HYDRUDANDS
4	DUDHE	HELANUDANDS
5	DVIUD	UDIVTRANDS
6	EAQHY	HYDRAQUENTS
7	EAQPS	PSAMMAQUENTS
8	EFLTR	TROPOFLUVENTS
9	EPSTR	TROPOPSAMMENTS
10	HFITR	TROPOFIBRISTS
11	HHETR	TROPOHEMISTS
12	IQATR	TROPOAQUEPTS
13	ITRDY	DYSTROPEPTS
14	ITREU	EUTROPEPTS
15	ITRHU	HUMITROPEPTS
16	MUDAR	ARGIUDOLLS
17	MUDHA	HAPLUDOLLS

DATAFILE NAME: ST4.DBF

REC	ST4-CL	ST-NM
1	PA	PACHIC
2	AA	TYPIC
3	AC10	ACRUDOCIX
4	AQ19	AQUIC EUTRIC
5	EU	EUTRIC
6	AQ06	AQUIC
7	OC02	OCHRIC
8	FL06	FLUVENTIC
9	LI05	LITHIC PSAMMENTIC
10	MO	MOLLIC
11	HA02	HAPLIC
12	HI	HISTIC
13	AN	ANDIC
14	LI03	LITHIC RUPTIC
15	AN25	ANDIC OXIC
16	OX	OXIC
17	AN02	ANDIC AQUIC
18	AN10	ANDIC PLUVAQUENTIC
19	AN12	ANDIC FLUVENTIC

FILE NAME: CU-E

CU-E	DESCR-E	DESCR-S
1	Annual crops (very high yield)	Cultivos anuales (muy alto rendimiento)
2	Annual crops (high yield)	Cultivos anuales (alto rendimiento)
3	Annual crops (moderately high yield)	Cultivos anuales (moderado rendimiento)
4	Perennial or semiperennial crops	Cultivos permanentes o semipermanentes
5	Intensive grazing	Pastoreo intensivo
6	Extensive grazing	Pastoreo extensivo
7	Forest crops	Cultivos arbóreos
8	Intensive forest production	Producción forestal intensivo
9	Extensive forest production	Producción forestal extensivo
10	Protection	Protección

FILE NAME: CU-FL

CU-FL	DESCR-E	DESCR-S
c	climate factor	factor clima
c1	limitation for life zone	limitación por zona de vida
c2	limitation for dry months	limitación por meses secos
c3	limitation for wind	limitación por viento
c4	limitation for fog	limitación por neblina
e	erosion factor	factor erosión
e1	limitation for erosion risk (slope)	limitación por riesgo de erosión (pendiente)
e2	limitation for erosion suffered	limitación por erosión sufrida
e3	limitation for micro-relief	limitación por micro-relieve
s	soil factor	factor suelo
s1	limitation for soil depth	limitación por profundidad efectiva
s2	limitation for texture	limitación por textura
s3	limitation for pH	limitación por pH
s4	limitation for stones or rocks	limitación por pedregosidad y/o rocosidad
s5	special limitations (toxicity,salinity, etc.)	limitaciónes especiales (toxicidad,salinidad, etc.)
d	drainage factor	factor drenaje
d1	limitation for drainage conditions	limitación por condición de drenaje
d2	limitation for flooding hazard	limitación por riesgo de inundación

DATAFILE NAME: SULUT.DBF VERSION 1.0 30-03-1992

MU-ID	SC-0	SC-11	SC-12	SC-13	SC-14	SC-21	SC-22	SC-23	SC-24	SC-31	SC-32	SC-33	SC-34	SC-41	SC-42	SC-51	SC-52	SC-53	MSC-1	MSC-2	MSC-3	MSC-4	MSC-5	SC-TOT
1	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100
2	0	0	0	0	0	0	0	0	0	40	0	0	60	0	0	0	0	0	0	0	100	0	0	100
3	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	40	0	0	0	60	0	40	100
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	100
5	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	100
11	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
12	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
13	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
14	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	30	0	0	0	70	100
15	0	0	70	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	70	0	0	0	30	100
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
20	0	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	80	0	0	0	20	100
21	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	70	0	0	0	30	70	100
23	0	80	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
24	0	0	40	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
25	0	0	90	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	90	0	0	0	10	100
26	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	100
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	100
29	0	70	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	0	100
31	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	50	0	0	0	50	100
32	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	20	0	0	0	80	100
33	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
34	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0	100
35	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100
36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
38	0	0	60	0	0	0	0	0	0	0	0	0	20	0	0	0	20	0	60	0	20	0	20	100
39	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0	100
40	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	30	0	0	0	70	100

DATAFILE NAME: SULUT.DBF VERSION 1.0 30-03-1992

MU-ID	SC-0	SC-11	SC-12	SC-13	SC-14	SC-21	SC-22	SC-23	SC-24	SC-31	SC-32	SC-33	SC-34	SC-41	SC-42	SC-51	SC-52	SC-53	MSC-1	MSC-2	MSC-3	MSC-4	MSC-5	SC-TOT
41	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	70	0	0	0	0	30	0	70	100
42	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	30	0	0	0	0	70	0	30	100
43	0	40	50	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	90	0	0	0	10	100
44	0	0	20	0	0	0	0	0	0	0	0	0	0	0	10	0	70	0	20	0	0	10	70	100
45	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
46	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	20	0	0	0	0	80	0	20	100
47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	100
48	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	80	0	0	0	0	20	0	80	100
49	0	0	60	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	60	0	40	0	0	100
50	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	30	0	0	0	70	100
51	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	80	0	0	0	20	100
52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	40	30	0	0	0	0	30	70	100
53	0	0	70	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	70	0	30	0	0	100
54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	100
55	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	100
57	0	70	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	70	0	0	30	0	100
61	0	80	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
62	0	20	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
63	0	30	50	0	0	0	0	0	0	0	0	0	10	0	0	10	0	0	80	0	10	0	10	100
64	0	0	70	0	0	0	0	0	0	0	0	0	20	0	0	10	0	0	70	0	20	0	10	100
65	0	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	100
67	0	80	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
68	0	0	40	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
69	20	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0	0	0	80	0	0	100
70	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	40	0	0	0	60	0	40	100
71	10	10	10	0	0	0	0	0	0	0	0	0	60	0	0	0	10	0	20	0	60	0	10	100
72	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	50	0	0	0	50	0	50	100
73	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
74	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0	100
75	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0	100
77	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	80	0	0	0	20	100
79	0	0	0	0	0	40	0	0	0	0	0	0	0	0	20	0	40	0	0	40	0	20	40	100
80	0	10	10	0	0	0	0	0	0	0	0	0	40	0	0	20	20	0	20	0	40	0	40	100
82	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	100	0	0	100
83	0	80	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
84	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
85	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	0	100

MU-ID	SC-0	SC-11	SC-12	SC-13	SC-14	SC-21	SC-22	SC-23	SC-24	SC-31	SC-32	SC-33	SC-34	SC-41	SC-42	SC-51	SC-52	SC-53	MSC-1	MSC-2	MSC-3	MSC-4	MSC-5	SC-TOT
87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	70	0	0	0	30	70	100
88	0	70	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	70	0	0	30	0	100
89	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	100
91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	70	0	0	0	0	30	70	100
94	0	60	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
95	0	0	90	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	90	0	0	10	0	100
96	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	20	30	0	0	0	50	0	50	100
97	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	30	0	0	0	70	100
98	0	10	30	0	0	0	0	0	0	0	0	0	0	0	0	50	10	0	40	0	0	0	60	100
99	0	20	40	0	0	0	0	0	0	0	0	0	0	0	0	0	40	0	60	0	0	0	40	100
100	0	0	40	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	40	0	60	0	0	100
101	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
102	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
103	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100
104	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	60	40	0	0	0	100
106	0	0	0	0	60	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	100	0	0	100
107	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	0	0	0	0	100
109	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
110	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
111	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
112	0	100	0	0	0	0	0	0	0	0	0	0	20	0	0	20	0	0	60	0	20	0	20	100
113	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100
115	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	20	0	0	60	0	20	0	20	100
116	0	40	20	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	100	0	0	0	0	100
117	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
118	0	80	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100
119	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
120	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100
121	0	20	0	0	0	0	0	0	0	0	0	0	40	0	0	20	20	0	20	0	40	0	40	100
122	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	70	0	0	0	100
123	0	100	0	0	0	70	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
124	0	60	30	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	90	0	0	10	0	100
125	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100
126	0	70	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
127	0	20	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
128	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
129	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	30	10	0	100
130	0	30	30	0	0	0	0	0	0	0	0	0	30	0	10	0	0	0	100	0	0	0	0	100
131	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	70	0	0	100
132	0	0	30	0	0	0	0	0	0	0	0	70	0	0	0	0	0	0	0	0	0	0	0	100

MU-ID	SC-0	SC-11	SC-12	SC-13	SC-14	SC-21	SC-22	SC-23	SC-24	SC-31	SC-32	SC-33	SC-34	SC-41	SC-42	SC-51	SC-52	SC-53	MSC-1	MSC-2	MSC-3	MSC-4	MSC-5	SC-TOT
133	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
134	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	0	30	0	0	0	70	0	30	100
135	0	10	70	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	80	0	20	0	0	100
136	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
137	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
138	0	0	60	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0	60	0	40	0	0	100
139	0	0	20	0	0	0	0	0	0	0	0	0	60	0	0	0	20	0	20	0	60	0	20	100
140	0	60	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
142	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100	100
143	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	100
144	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
145	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0	100
146	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	50	0	50	0	0	50	100
147	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	100
148	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
149	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
150	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	30	0	50	20	0	0	80	100
151	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	70	0	30	0	0	0	100	100
152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	100	100
153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
154	0	0	80	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	100
155	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	100
156	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	80	0	20	100
157	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	20	0	0	0	0	0	20	100
158	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	40	0	0	0	60	0	40	100
159	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	40	0	0	60	0	0	40	100
160	0	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0	20	0	0	80	0	0	20	100
161	0	0	0	0	0	0	0	0	70	0	0	0	0	0	0	0	30	0	0	0	70	0	30	100
162	0	0	10	0	0	90	0	0	0	0	0	0	0	0	0	0	0	0	0	10	90	0	0	100
163	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	80	0	0	0	0	20	0	100
164	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	50	0	0	0	50	0	0	100
166	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	80	0	0	20	0	0	0	100
167	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100
168	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100
169	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	100	0	0	100
170	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0	0	20	0	0	0	80	0	0	100
171	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
172	0	70	0	0	0	0	0	0	0	20	0	0	0	0	0	10	0	0	0	70	20	0	10	100
173	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	50	20	0	0	0	30	0	100
181	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	100

DATAFILE NAME: PHYSHU.DBF VERSION 1.0 30-03-1992

HU-ID	TU1		TU2		TU3		TU4		TU5	
	CF	%	CF	%	CF	%	CF	%	CF	%
1	A35	100		0		0		0		0
2	A33	60	A33	40		0		0		0
3	A33	60	T3	30	A3	10		0		0
4	T3	60	A3	40		0		0		0
5	A13	80	A2	20		0		0		0
6	V9	100		0		0		0		0
7	P5	100		0		0		0		0
8	V15	80	V9	20		0		0		0
9	V15	70	V9	30		0		0		0
10	T2	100		0		0		0		0
11	A23	100		0		0		0		0
12	A17	40	A18	40	A19	20		0		0
13	V12	100		0		0		0		0
14	V14	70	V11	30		0		0		0
15	V11	70	V14	30		0		0		0
16	V2	70	V1	30		0		0		0
17	V1	100		0		0		0		0
18	V2	100		0		0		0		0
19	V4	60	V5	40		0		0		0
20	A20	60	A22	20	A15	20		0		0
21	A28	70	A3	30		0		0		0
22	A12	70	A12	30		0		0		0
23	A8	80	A3	20		0		0		0
24	A9	40	A7	20	A7	20	A7	20		0
25	A20	60	A22	30	T1	10		0		0
26	A8	100		0		0		0		0
27	T1	50	A20	30	A15	20		0		0
28	T1	100		0		0		0		0
29	A5	70	A4	30		0		0		0
30	L1	100		0		0		0		0
31	L1	50	L2	50		0		0		0
32	T4	80	L1	20		0		0		0
33	A22	100		0		0		0		0
34	V20	100		0		0		0		0
35	V20	100		0		0		0		0
36	P1	60	P2	40		0		0		0
37	P5	80	P5	20		0		0		0
38	A18	60	A15	20	A25	20		0		0
39	V19	70	V19	30		0		0		0
40	L2	70	L1	30		0		0		0
41	V21	70	V21	30		0		0		0
42	V21	70	V21	30		0		0		0
43	A18	30	A17	20	A17	20	A17	20	A20	10
44	A20	50	T1	20	A17	20	A17	10		0
45	A19	50	A18	30	A17	20		0		0
46	V20	80	V20	20		0		0		0
47	T4	60	A20	40		0		0		0
48	V20	80	V20	20		0		0		0
49	A33	40	A18	30	A19	20	A17	10		0
50	A17	30	A15	30	T2	20	T1	20		0
51	A14	80	A14	20		0		0		0
52	A25	40	A20	30	L2	30		0		0
53	A33	30	A18	30	A19	30	A17	10		0
54	T4	100		0		0		0		0
55	A21	100		0		0		0		0

DATAFILE NAME: PHYSHU.DBF VERSION 1.0 30-03-1992

HU-ID	TU1		TU2		TU3		TU4		TU5	
	CF	%	CF	%	CF	%	CF	%	CF	%
56	T5	100		0		0		0		0
57	A21	70	A11	30		0		0		0
61	A6	80	A24	20		0		0		0
62	A24	80	A6	20		0		0		0
63	A24	50	A6	30	A25	10	A33	10		0
64	A24	40	A18	30	A33	20	A25	10		0
65	A17	50	A19	30	A17	20		0		0
66	T1	50	A20	30	A15	20		0		0
67	A4	80	A31	20		0		0		0
68	A9	40	A7	20	A7	20	A7	20		0
69	V21	80	V22	20		0		0		0
70	V21	60	A20	30	T1	10		0		0
71	V21	60	A17	10	A17	10	T3	10	V22	10
72	A33	50	A20	30	T1	20		0		0
73	P4	100		0		0		0		0
74	L3	100		0		0		0		0
75	P7	100		0		0		0		0
77	A14	80	A14	20		0		0		0
79	A29	40	A20	40	A17	20		0		0
80	A33	40	A25	20	A3	20	A17	10	A17	10
82	A27	100		0		0		0		0
83	A6	80	A2	20		0		0		0
84	A5	100		0		0		0		0
85	A4	100		0		0		0		0
86	A16	100		0		0		0		0
87	A10	70	A11	30		0		0		0
88	A21	70	A11	30		0		0		0
89	A19	70	A16	30		0		0		0
90	T2	70	A20	30		0		0		0
91	A20	70	A17	30		0		0		0
94	A17	40	A19	30	A17	20	A24	10		0
95	A17	50	A19	40	A17	10		0		0
96	A33	50	A3	30	A25	20		0		0
97	A15	70	A17	20	A18	10		0		0
98	A25	50	A17	30	A17	10	A3	10		0
99	A17	40	A20	40	A17	20		0		0
100	A33	60	A31	40		0		0		0
101	A31	100		0		0		0		0
102	A4	100		0		0		0		0
103	A1	100		0		0		0		0
104	A34	100		0		0		0		0
106	V12	60	A34	40		0		0		0
107	A32	100		0		0		0		0
109	A31	100		0		0		0		0
110	A34	100		0		0		0		0
111	A22	100		0		0		0		0
112	A5	100		0		0		0		0
113	A5	60	A33	20	A25	20		0		0
115	A34	100		0		0		0		0
116	A17	40	A16	20	A33	20	A25	20		0
117	A5	100		0		0		0		0
118	A5	80	A35	20		0		0		0
119	A27	100		0		0		0		0
120	A6	80	A2	20		0		0		0
121	A33	40	A25	20	A6	20	A3	20		0

DATAFILE NAME: PHYSHU.DBF VERSION 1.0 30-03-1992

HU-ID	TU1		TU2		TU3		TU4		TU5	
	CF	%	CF	%	CF	%	CF	%	CF	%
122	A27	70	A17	30		0		0		0
123	A6	80	A17	20		0		0		0
124	A17	60	A16	20	A19	10	A17	10		0
125	A33	100		0		0		0		0
126	A6	70	A24	30		0		0		0
127	A35	80	A5	20		0		0		0
128	A4	100		0		0		0		0
129	A6	100		0		0		0		0
130	A33	30	A18	30	A17	30	A17	10		0
131	A17	100		0		0		0		0
132	A35	70	A18	30		0		0		0
133	A6	100		0		0		0		0
134	A33	70	A3	30		0		0		0
135	A18	50	A17	20	A33	20	A17	10		0
136	A24	100		0		0		0		0
137	A19	60	A16	40		0		0		0
138	V23	40	A18	40	A17	20		0		0
139	A25	60	A18	20	A15	20		0		0
140	A21	60	A19	40		0		0		0
141	V8	100		0		0		0		0
142	V2	100		0		0		0		0
143	V9	100		0		0		0		0
144	V10	100		0		0		0		0
145	V15	100		0		0		0		0
146	A34	50	V6	50		0		0		0
147	A34	100		0		0		0		0
148	A30	100		0		0		0		0
149	A34	50	A35	30	A1	20		0		0
150	A34	100		0		0		0		0
151	V6	50	V6	30	V7	20		0		0
152	V6	70	V6	30		0		0		0
153	V17	100		0		0		0		0
154	A34	50	A34	30	A1	20		0		0
155	A5	80	A26	20		0		0		0
156	V16	100		0		0		0		0
157	V15	80	V15	20		0		0		0
158	V15	60	V15	40		0		0		0
159	V12	60	V17	40		0		0		0
160	V17	80	V17	20		0		0		0
161	V18	70	V18	30		0		0		0
162	A35	90	A1	10		0		0		0
163	V15	80	V15	20		0		0		0
164	V15	50	V15	50		0		0		0
166	V17	80	V10	20		0		0		0
167	V15	100		0		0		0		0
168	V13	100		0		0		0		0
169	A34	100		0		0		0		0
170	V18	80	V18	20		0		0		0
171	V3	100		0		0		0		0
172	A5	50	A34	20	A5	20	A11	10		0
173	A25	50	A33	30	A15	20		0		0
181	A32	100								

ANNEX 6 LIST OF AML PROGRAMS

▲ *COMMON PROGRAMS (USED ON SEVERAL WORKSPACES)*

scalebars:

- B10.AML
- B100.AML
- B200.AML
- B400.AML
- B2000.AML
- B35000.AML
- B75000.AML
- B150000.AML
- B750000.AML
- B2000000.AML
- B2500000.AML

north arrows:

- N1.AML
- N2.AML
- N10.AML
- N11.AML
- N75000.AML
- N200000.AML
- NA.AML
- NLD.AML

topography:

- TOPO.AML
- ROADS.AML
- ROAD1.AML
- ROAD2.AML
- ROAD3.AML
- ROAD4.AML
- ROAD5.AML
- RIVERS.AML

▲ *PROGRAMS USED FOR SPECIFIC PRODUCTS*

[ZAN]

- ADM.AML Plot of administrative boundaries
- MSC.AML Plot of area percentage classes of selected major suitability class (MSC-1...MSC-5)
- MSCX.AML Plot of major suitability classes (item LUTSU1 of LE.DBF)
- PHYS.AML Plot of physiographic legend (A1-paper size)
- SP13.AML Plot of soil development
- SUELO.AML Plot of soil legend (A1-paper size)
- TP1.AML Plot physiography
- TP2.AML Plot of lithostratigraphy
- TP6-CAL.AML Plot of soil slope
- ZAN-LP.AML Plot of mapping units with MU-ID's and topography
- ZANRR-CAL.AML Plot of topography
- ZANST-LP.AML Plot of mapping units with MU-ID's

[GCM]

- CU.AML Plot of 'Capacidad de uso' (items CU-E1,CU-E2 of file LE.DBF)
- DEMO.AML Demonstration program (Tektronix terminal 4208 is needed; to be invoked from 'Arc:' prompt)
- D2.AML Subprogram of demo
- D3.AML Subprogram of demo
- DEM-REQ.AML Subprogram of demo
- REQ.AML Plot of requirements (items NU-C1,NU-C2,AG-C12,ER-C1,ER-C2 of file LE.DBF
- SUC.AML Plot of suitability (items LSU-C1,LSU-C2 of LE.DBF)
- TOPO.AML Plot of topography (used by other AML's)
- TOPO-TEK.AML Plot of topography (used by other AML's)
- GCMRR.AML Plot of GCMRR

[NEG]

- MU.AML Plot of MU-ID's
- REQ2.AML Plot of requirements (items NU-C1,NU-C2,AG-C12,ER-C1,ER-C2 of file LE.DBF)
- S13.AML Plot of fertility and geology (several legend structures)
- S13-E1.AML Legend type of S13.AML
- S13-E2.AML Legend type of S13.AML
- S13-S1.AML Legend type of S13.AML
- S13-S2.AML Legend type of S13.AML
- SC.AML Plot of suitability subclasses (item LUTSU2 of LE.DBF)
- SU.AML Plot of soil units
- SU-TP9.AML Plot of soil units and surface stoniness
- SUC.AML Plot of suitability (items LSU-C1,LSU-C2 of LE.DBF)
- TP234.AML Plot of physiography (GP1,TP3 & TP4)
- TP234-LEG.AML Legend of plot of TP234.AML

[POC]

- MU-ID.AML Plot of Mapping Unit identifiers
- TP10.AML Plot of soil units
- POCRR.AML Plot of topography
- POCRR-LEG.AML Legend of POCRR.AML

[KLAD]

- GEN-ANNO.AML Generation of annotation coverage <ANNO-UNIT> *
- GEN-ANNO2.AML Generation of annotation coverage <ANNO2-UNIT> *
- GEN2-ANNO.AML Generation of annotation for coverage *
- GEN2-ANNO2.AM Generation of annotation for coverage <ANNO2-UNIT> *
- TOPMAP.AML Plot of map of Costa Rica (scale 1:2000000)
- TOPMAP2.AML Plot of map of Costa Rica (scale 1:2500000)
- TOPMAP3.AML Plot of map of Costa Rica (scale 1:2500000)
- TOPMAP4.AML Plot of map of Costa Rica (scale 1:4000000)
- GEN.AML Generation of topsheets *
- GEN2.AML Generation of topsheets *
- GEN3.AML Generation of points to estimate corners of topsheets *
- NDX.AML Macro to be used within ARC/EDIT to generate coverage <TOPNDX>
- NDX-TEK.AML Plot of <TOPNDX>
- SETANNO.AML Macro to be used within ARC/EDIT to generate annotation for coverage <TOPNDX>

[AP80]

- LABEL.AML Plot of MU-ID's and TU-ID's for photo L17021

[FLD]

- RLU.AML Plot of reorganised land use for coverage <FLDST>
- SL.AML Plot of soil units, <FLDST>
- SOILS.AML Plot of soilunits , <FLDST>
- SPRRLINE.AML Plot of parcel boundaries & topography <FLDST>

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* to be invoked from the 'Arc:' prompt

ANNEX 7 LIST OF INFO-PROGRAMS

▲ *ORDERED PER WORKSPACE*

[ZAN]

- ASU.PRG	Writes all soil associations and the MU-ID's where these are found to file ASU.DBF (uses file SMASU.DBF, eventually run SMASU.PRG first)
- ASU-SRT.PRG	Sorting of ASU.DBF, several options to order the file can be selected (alphabetical, taxonomic etc.).
- ASU-LST.PRG	Listing of associated soils to screen or NSP-printfile
- IDA-SLT.PRG	Calculation of symbol codes for file IDA.SLT
- IT-CHECK.PRG	Check and correction of numeric values in character items
- LUTSU.PRG	Calculation of items LUTSU1 and LUTSU2 of files LUTSU.DBF and LE.DBF
- MSC-KEY.PRG	Generation of keyfiles with percentage classes of area qualified for a selected major suitability classes: MSC-1, MSC-2, MSC-3, MSC-4, MSC-5
- MSCY-KEY.PRG	Generation of a keyfile with suitability subclasses (SC-11...SC-53)
- MSCX-KEY.PRG	Generation of a keyfile with major suitability classes (MSC-1...MSC-5)
- MU-HA.PRG	Recalculation of values of MU-HA of file STMU.DBF
- PHASU.PRG	Writes all soil phases and the MU-ID's where these are found to file PHASU.DBF
- PHYS-CODE.PRG	Generation of codes for legend units of the physiographic legend, results are written to file PHYS-CODE.DBF
- PHYSCODE-LST.	Listing of physiographic legend codes to screen or file; output format: per MU-ID the physiographic legend code is indicated for TU1 ... TU5.
- PHYS-SLT.PRG	Assignment of symbol codes to TU-ID's dependent of hierarchical legend structuring (PHYS.PRG), results are written to file PHYS.SLT
- PHYS.PRG	Generation of keyfile for physiographic maps, dynamic legend structuring is possible.
- PHYSMU-LST.PR	Listing to screen or to NSP-printfile of phys-codes and their percentage of area coverage within mapping units
- SMASU.PRG	Determination of different combinations of soiltypes (SU-ID's) and soil phases (TU-ID's) within mapping units, results are written to SMASU.DBF (uses SMU.DBF, eventually run SMU.PRG first).
- SMU.PRG	Generation of contents of file SMU.DBF, this file describes the mapping unit composition like file STMU.DBF, but besides TU-ID's the SU-ID's within TU1...TU5 are indicated (SU1-ID...SU5-ID)
- SULUT.PRG	Calculation of percentage of area coverage of suitability classes (LUTSU1,LUTSU2) within each mapping unit, results are written to file SULUT.DBF
- TP-HA.PRG	Calculation of ha of coverage of TP-attribute values
- TPHA-LST.PRG	Listing of area coverage in ha and percentages to screen or NSP-printfile
- TP1.PRG	Recalculation of percentage of area coverage of attribute values of TP1 (physiography)
- TP1-KEY.PRG	Generation of keyfiles for TP1
- W1.PRG	Calculation of sum of MU-HA in file STMU.DBF
- W2.PRG	Calculation of total ha in file ZANST.PAT
- WLIS.PRG	Listing of items (1) LUTSU1, LUTSU2, (2) TP6, TP8, TP9, TP10, (3) SP6, SP11, SP13; which belong to following files: (1) LE.DBF and LUTSU.DBF, (2) TU.DBF, (3) SU.DBF

[GCM]

- REQ.PRG — Calculation of requirements per TU (items NU-C1,NU-C2,AG-C12,OX-C12,LA-C12,ER-C1,ER-C2 of file LE.DBF), results are written to file REQ.DBF
- SUC.PRG — Calculation of suitability classes per TU (items LSU-C1,LSU-C2 of file LE.DBF), results are written to file REQ.DBF

[NEG]

- LEG.PRG — Legend structuring with selection of TP's and SP's
- MSCX-KEY.PRG — Generation of keyfile of suitability classes (item LUTSU1 of LE.DBF) for coverage <NEG>
- MSCY-KEY.PRG — Generation of keyfile of suitability subclasses (item LUTSU2 of LE.DBF) for coverage <NEG>
- NEGMU-HA.PRG — Update of values of MU-HA in file NEGMU.DBF
- SU-KEY.PRG — Generation of keyfile of soil units for coverage <NEG>
- S13-SLT.PRG — Calculation of symbol codes of file S13.SLT
- T2-SLT.PRG — Calculation of symbol codes of file T2.SLT
- TP234-SLT.PRG — Calculation of symbol codes of file T234.SLT

[GRS]

- COMBI.PRG — Calculation of area of land use classes within each mapping unit (MU-ID's of coverage <PMUGRS>)

▲ *.FUNCTIONALLY ORDERED*

RUDIMENTARY DATA ACQUISITION	ADVANCED DATA ACQUISITION	DATA TOOL APPLICATIONS
LUTSU.PRG	ASU.PRG	ASU-LST.PRG
MSC-KEY.PRG	COMBI.PRG	ASU-SRT.PRG
MSCX-KEY.PRG	LEG.PRG	IDA-SLT.PRG
MSCY-KEY.PRG	PHASU.PRG	IT-CHECK.PRG
MU-HA.PRG	PHYS.PRG	PHYS-CODE.PRG
NEGMU-HA.PRG	SMASU.PRG	PHYS-SLT.PRG
REQ.PRG	SMU.PRG	PHYSMU.PRG
SU-KEY.PRG		S13-SLT.PRG
SUC.PRG		TPHA-LST.PRG
SULUT.PRG		TP234-SLT.PRG
TP-HA.PRG		T2-SLT
TP1.PRG		WLIS.PRG
TP1-KEY.PRG		W1.PRG
		W2.PRG

ANNEX 8 INDEX OF TOPSHEETS

Coverage <TOPNDX>, stored on workspace TOPS, is an index coverage for topsheets. All topsheet clipping edges, which mark the borders of 1:50000 topsheets, are joined into coverage <TOPNDX>. The polygons have received a user-id, the TOPNDX-ID, which is the key to the names of the topsheets. File TOPNDX.DBF (see table A) stores the topsheet names. Figure A shows coverage <TOPNDX> with the names of all topsheets. The topsheet clipping edges can be used to make clips from e.g. coverage <ZANST>. Coverage <TOPNDX> may be helpful by selecting which topsheet clipping edge will be used.
The topsheets are generated with the command *GENERATE*. This has been done by entering the coordinates of the four corner points for each coverage. File TOPPNT.DBF stores coordinates which are used to define the topsheets clipping edges mentioned above. In table B these coordinates are listed. The TOPPNT-ID is an identifier code which can be related to the point coverage <TOPPNT>. This coverage stores all the corner points of the topsheet clipping edges. Table B can be used to find the exact coordinates of a certain point in figure B. Some of the points on the coverage, e.g. those located outside Costa Rica, have estimated coordinates, for as no data of their exact location was available. In table B this is registered in item 'ESTIMATE', the estimated coordinates have received a value '1' whereas the official coordinates are indicated with value '0'.

TABLE A Datafile TOPNDX.DBF

REC	TOPNDX-ID	TOPSHEET
1	0	
2	1	PUNTA CASTILLA
3	2	CUTRIS
4	3	TRINIDAD
5	4	COLORADO
6	5	CHAPARRON
7	6	CHIRRIPO ATL.
8	7	TORTUGUERO
9	8	RIO CUARTO
10	9	RIO SUCIO
11	10	AGUA FRIA
12	11	CALIFORNIA
13	12	POAS
14	13	GUAPILES
15	14	GUACIMO
16	15	PARISMINA
17	16	MOIN-NORTE
18	17	BARBA
19	18	CARRILLO
20	19	BONILLA
21	20	MATINA
22	21	MOIN
23	22	ABRA
24	23	ISTARU
25	24	TUCURRIQUE
26	25	BARBILLA
27	26	RIO BANANO
28	27	SAN ANDRES
29	28	CHIRRIPO
30	29	ESTRELLA
31	30	CAHUITA
32	31	MATAMA
33	32	TELIRE

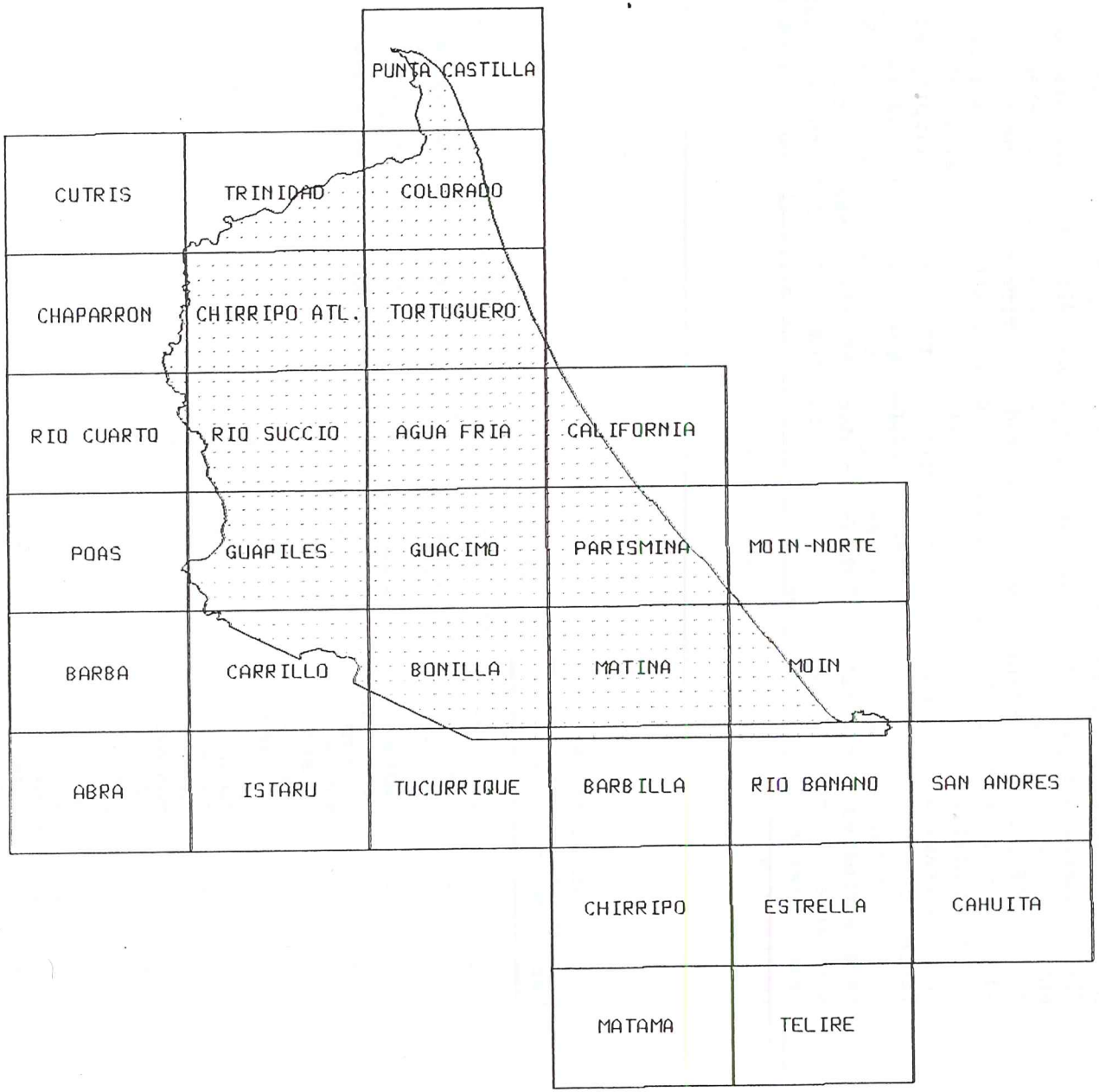

FIGURE A Coverage <TOPNDX>, the North eastern Atlantic Zone is also indicated

TABLE B Datafile TOPPNT.DBF

REC	TOPPNT-ID	X	Y	ESTIMATE
1	1	536,449.109	330,827.494	1
2	2	563,785.915	330,867.198	1
3	3	591,122.684	330,928.561	1
4	4	618,586.023	331,028.000	1
5	5	646,107.735	331,049.000	1
6	6	509,112.279	312,375.630	0
7	7	536,449.109	312,393.687	0
8	8	563,785.915	312,433.413	0
9	9	591,122.684	312,494.808	0
10	10	618,586.023	312,494.808	1
11	11	646,107.735	312,494.808	1
12	12	509,117.150	293,941.813	0
13	13	536,468.592	293,957.880	0
14	14	563,820.009	293,999.628	0
15	15	591,171.389	294,061.055	0
16	16	618,586.023	294,061.055	1
17	17	646,107.735	294,348.857	1
18	18	509,122.020	275,508.381	0
19	19	536,488.073	275,526.458	0
20	20	563,854.102	275,566.226	0
21	21	591,220.094	275,627.686	0
22	22	618,586.023	275,710.838	0
23	23	646,107.735	275,710.838	1
24	24	509,126.890	257,075.176	0
25	25	536,507.555	257,093.262	0
26	26	563,888.195	257,133.052	0
27	27	591,268.798	257,194.545	0
28	28	618,649.338	257,277.741	0
29	29	646,107.735	257,382.730	1
30	30	509,131.761	238,642.037	0
31	31	536,527.036	238,660.133	0
32	32	563,922.288	238,699.944	0
33	33	591,317.501	238,761.470	0
34	34	618,712.653	238,844.711	0
35	35	646,107.735	238,949.667	0
36	36	509,136.631	220,208.811	0
37	37	536,546.518	220,226.917	0
38	38	563,956.381	220,266.749	0
39	39	591,366.205	220,328.307	0
40	40	618,775.968	220,411.593	0
41	41	646,185.661	220,516.604	0
42	42	673,595.261	220,643.343	0
43	43	701,112.000	220,643.343	1
44	44	509,141.502	201,775.336	0
45	45	536,566.000	201,793.451	0
46	46	563,990.474	201,833.304	0
47	47	591,414.910	201,894.890	0
48	48	618,839.284	201,978.225	0
49	49	646,263.588	202,083.293	0
50	50	673,687.799	202,210.099	0
51	51	701,112.000	202,210.099	1
52	52	509,146.372	183,341.486	0
53	53	536,585.482	183,359.581	0
54	54	564,024.568	183,399.456	0
55	55	591,463.616	183,461.080	0
56	56	618,902.601	183,544.454	0
57	57	646,341.517	183,649.578	0
58	58	673,780.340	183,776.451	0
59	59	701,112.000	183,776.451	1
60	63	591,512.323	165,026.702	0
61	64	618,965.920	165,110.121	0
62	65	646,419.448	165,215.301	0

estimate '0' = official coordinates of topsheet corner point
estimate '1' = estimated coordinates of topsheet corner point

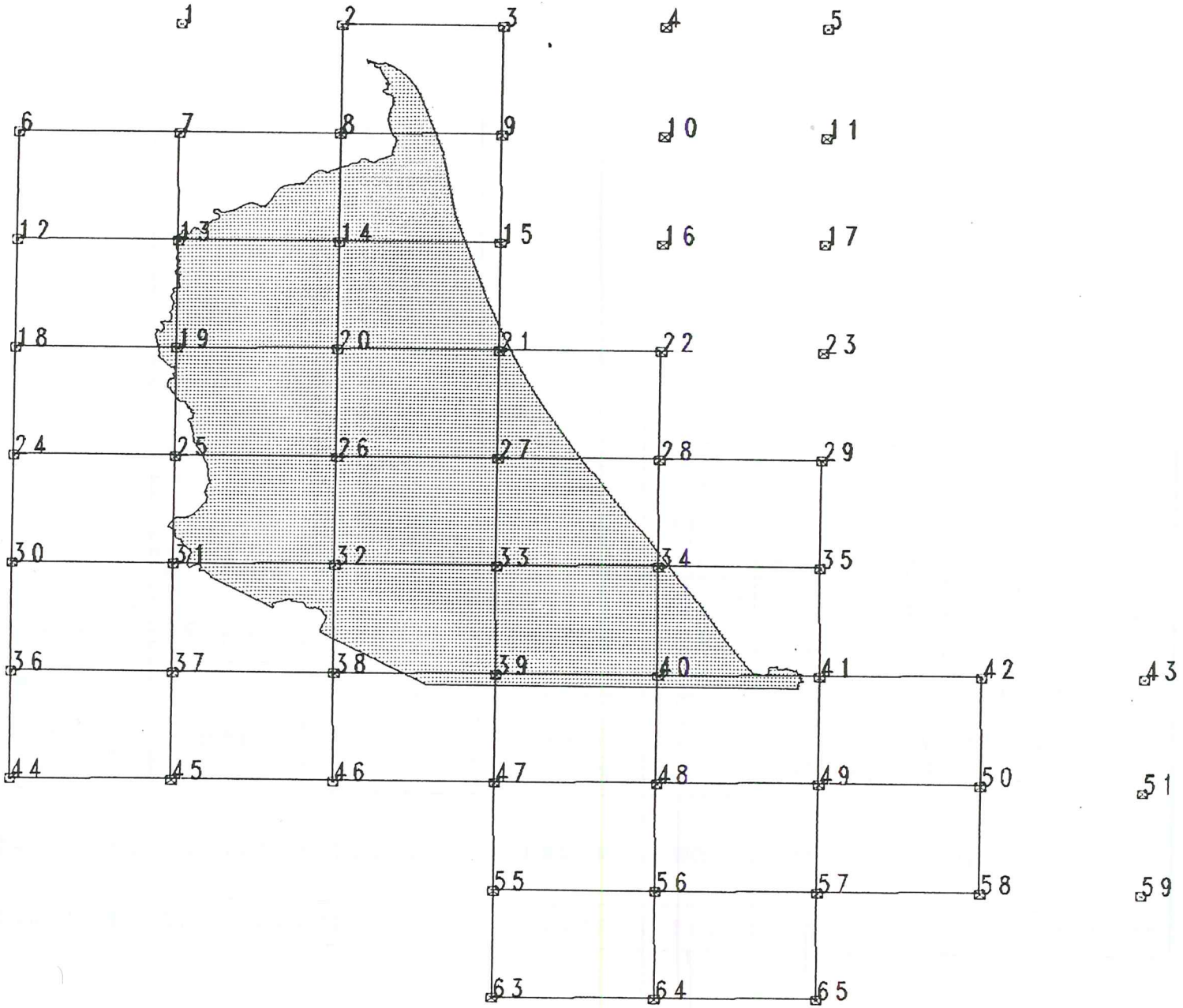

FIGURE B Coverage <TOPPNT>, also indicated: coverage TOPNDX, location of North eastern Atlantic Zone

```
/* FILE    : TP1.AML
/* CONTENT: MACRO TO PLOT TP1 OF FILE <ZANSTU.DBF> FOR TU1 IN COVERAGE <ZANST>
/* PATTERN: FILL / LINE
/* DEVICE : TEKTRONIX
/* USES   : ZANST.DIR
/*          TU.DBF
/*          TU.REL
/*          TP1-FC.SHD / TP1-FG.SHD / TP1-LC.SHD / TP1-LG.SHD
/*          TP1-S.KEY / TP1-E.KEY
/*          TP1.SLT
/*          N75000.AML / B750000.AML


/* SYSTEM INIT
/* &TERMINAL 4208
/* DISPLAY 4208
CLEAR
/* &DALINES 0

/* USER INIT
&TYPE \\'PLOT OF PHYSIOGRAPHY FOR DOMINANT TERRAIN UNIT OF COVERAGE <ZANST>.'
&TYPE \'DEFAULT TEXT IS ENGLISH.'
&IF [QUERY 'DO YOU WANT TO CHANGE TO SPANISH TEXT (Y/N) ' .TRUE] &THEN
  &DO
    &SV MAPTITLE := MAPTIT-S1.TXT
    &SV LEGTITLE := LEGTIT-S1.TXT
    &SV MAPNOTE  := MAPNOT-S1.TXT
    &SV AUTHOR   := AUTHOR1.TXT
    &SV KEY      := TP1-S.KEY
  &END
&ELSE
  &DO
    &SV MAPTITLE := MAPTIT-E1.TXT
    &SV LEGTITLE := LEGTIT-E1.TXT
    &SV MAPNOTE  := MAPNOT-E1.TXT
    &SV AUTHOR   := AUTHOR1.TXT
    &SV KEY      := TP1-E.KEY
  &END
&TYPE \'YOU CAN CHOOSE DIFFERENT SHADE PATTERNS.'
&TYPE 'THERE ARE FOUR COMBINATIONS: '
&TYPE '1 FILL PATTERN AND COLOR TONE'
&TYPE '2 FILL PATTERN AND GREY TONE'
&TYPE '3 LINE PATTERN AND COLOR TONE'
&TYPE '4 LINE PATTERN AND GREY TONE'
&SET NUMBER [RESPONSE 'PLEASE ENTER NUMBER TO SELECT ']
&SELECT %NUMBER%
  &WHEN 2
    &DO
      &SV SHADE := TP1-FG.SHD
      &SV LINCOL := 1
    &END
  &WHEN 3
    &DO
      &SV SHADE := TP1-LC.SHD
      &SV LINCOL := 3
    &END
  &WHEN 4
    &DO
      &SV SHADE := TP1-LG.SHD
      &SV LINCOL := 1
    &END
  &OTHERWISE
    &DO
      &SV SHADE := TP1-FC.SHD
      &SV LINCOL := 3
    &END
&END
&SV SLT = TP1.SLT
&TYPE \'DEFAULT NO PLOTFILE IS MADE, PLOT WILL BE DISPLAYED ON SCREEN ONLY.'
&IF [QUERY 'DO YOU WANT TO MAKE A PLOTFILE (Y/N) ' .TRUE] &THEN
  &DO
    &SV PLFILE := 1
    &SET PLOTNAME [RESPONSE 'ENTER NAME OF PLOTFILE ']
    &MESSAGE &OFF &INFO
    DISPLAY 1039 2
    %PLOTNAME%
    &MESSAGE &ON
  &END
&ELSE
  &DO
    &SV PLFILE := 0
    /* CLRSC
    /* &DALINES 4
  &END
/* END USER INIT

/* CLRSC
/* &DALINES 4

/* MAP DRAW
MAPEX ZANST
PAGEUNITS CM
MAPUNITS METERS
MAPSCALE 750000
MOVE 0.7 16.5
TEXTFONT 17
TEXTSIZE 0.5 0
TEXTFILE %MAPTITLE%
MOVE 16.7 9.5
TEXTSIZE 0.3 0
TEXTFILE %LEGTITLE%
MOVE 16.7 2.5
TEXTFONT 3
TEXTSIZE 0.2 0
&IF [QUERY 'WRITE NOTE (Y/N) ' .TRUE] &THEN
  &DO
    TEXTFILE %MAPNOTE%
  &END
LINEC 1
KEYPOS 16.7 8.5
KEYBOX 1.2 0.6
KEYSEP .5 .5
SHADESET %SHADE%
KEYSHADE %KEY%
MOVE 0.8 1.0
TEXTSIZE 0.15 0
&IF [QUERY 'INDICATE AUTHOR (Y/N) ' .TRUE] &THEN
  &DO
    TEXTFILE %AUTHOR%
  &END
&SETVAR .X := 16.7
&SETVAR .Y := 1.25
&RUN B750000.AML

/* POLYGONSHADE
&IF [QUERY 'DRAW MAP (Y/N) ' .TRUE] &THEN
  &DO
    RELATE RESTORE TU.REL
    SHADESET %SHADE%
    POLYGONSHADE ZANST TU1//TP1 %SLT%
  &END
/* END POLYGONSHADE

/* DROPLINE FOR TP1
&IF [QUERY 'DRAW POLYGON BOUNDARIES (Y/N)' .TRUE] &THEN
  &DO
    &IF [QUERY 'CHANGE DEFAULT LINE COLOR (Y/N)' .TRUE] &THEN
      &DO
        &SET LINCOL [RESPONSE 'PLEASE ENTER COLOR NUMBER ']
      &END
    RELATE RESTORE TU.REL
    LINECOL %LINCOL%
    DROPLINE ZANST TU1//TP1 NOTEXT
  &END
/* END DROPLINE FOR TP1

&SETVAR .A := 13.8
&SETVAR .B := 13.6
&RUN N75000.AML
/* END MAP DRAW

&IF %PLFILE% EQ 1 &THEN
  &DO
    /* DISPLAY 4208
  &END

&SV LINECOL 1
&RETURN
/* END TP1.AML
```

```
/* FILE    : TP234-LEG.AML
/* CONTENT: MACRO TO PLOT LEGEND OF PLOT OF MACRO TP234.AML

&SV POSY  := %.YPOS%
&SV POSX  := %.XPOS% + 9.0
KEYBOX 1.2 0.6
KEYSEP 0.3 0.4

TEXTSIZE 0.35
TEXTFONT 1
MOVE %.XPOS% %.YPOS%
TEXTFILE GP1-1.TXT
  TEXTSIZE 0.26
  TEXTFONT 0
  &SV .YPOS := %.YPOS% - 0.7
  MOVE %.XPOS% %.YPOS%
  TEXTFILE TP3-10.TXT
    &SV .YPOS := %.YPOS% - 0.4
    KEYPOS %.XPOS% %.YPOS%
    KEYSHADE PH-1.KEY

TEXTSIZE 0.35
TEXTFONT 1
&SV .YPOS := %.YPOS% - 3.1
MOVE %.XPOS% %.YPOS%
TEXTFILE GP1-3.TXT
  TEXTSIZE 0.26
  TEXTFONT 0
  &SV .YPOS := %.YPOS% - 0.8
  MOVE %.XPOS% %.YPOS%
  TEXTFILE TP3-5.TXT
    &SV .YPOS := %.YPOS% - 0.4
    KEYPOS %.XPOS% %.YPOS%
    KEYSHADE PH-2.KEY

  &SV .YPOS := %.YPOS% - 1.4
  MOVE %.XPOS% %.YPOS%
  TEXTFILE TP3-6.TXT
    &SV .YPOS := %.YPOS% - 0.4
    KEYPOS %.XPOS% %.YPOS%
    KEYSHADE PH-3.KEY

  &SV .YPOS := %.YPOS% - 3.4
  MOVE %.XPOS% %.YPOS%
  TEXTFILE TP3-7.TXT
    &SV .YPOS := %.YPOS% - 0.4
    KEYPOS %.XPOS% %.YPOS%
    TEXTSIZE 0.26
    KEYSHADE PH-4.KEY

&SV .XPOS := %POSX%
&SV .YPOS := %POSY%

TEXTSIZE 0.35
TEXTFONT 1
/* &SV .YPOS := %.YPOS% - 2.7
MOVE %.XPOS% %.YPOS%
TEXTFILE GP1-4.TXT
  TEXTSIZE 0.26
  TEXTFONT 0
  &SV .YPOS := %.YPOS% - 0.7
  MOVE %.XPOS% %.YPOS%
  TEXTFILE TP3-6.TXT
    &SV .YPOS := %.YPOS% - 0.4
    KEYPOS %.XPOS% %.YPOS%
    KEYSHADE PH-5.KEY

TEXTSIZE 0.35
TEXTFONT 1
&SV .YPOS := %.YPOS% - 3.1
MOVE %.XPOS% %.YPOS%
TEXTFILE GP1-5.TXT
  TEXTSIZE 0.26
  TEXTFONT 0
  &SV .YPOS := %.YPOS% - 0.7
  MOVE %.XPOS% %.YPOS%
  TEXTFILE TP3-1.TXT
    &SV .YPOS := %.YPOS% - 0.4
    KEYPOS %.XPOS% %.YPOS%
    TEXTSIZE 0.26
    KEYSHADE PH-6.KEY

  &SV .YPOS := %.YPOS% - 1.4
  MOVE %.XPOS% %.YPOS%
  TEXTFILE TP3-3.TXT
    &SV .YPOS := %.YPOS% - 0.4
    KEYPOS %.XPOS% %.YPOS%
    TEXTSIZE 0.26
    KEYSHADE PH-7.KEY

TEXTSIZE 0.35
TEXTFONT 1
&SV .YPOS := %.YPOS% - 2.1
MOVE %.XPOS% %.YPOS%
TEXTFILE GP1-6.TXT
  TEXTSIZE 0.26
  TEXTFONT 0
  &SV .YPOS := %.YPOS% - 0.7
  MOVE %.XPOS% %.YPOS%
  TEXTFILE TP3-2.TXT
    &SV .YPOS := %.YPOS% - 0.4
    KEYPOS %.XPOS% %.YPOS%
    KEYSHADE PH-8.KEY

  &SV .YPOS := %.YPOS% - 1.4
  MOVE %.XPOS% %.YPOS%
  TEXTFILE TP3-3.TXT
    &SV .YPOS := %.YPOS% - 0.7
    KEYPOS %.XPOS% %.YPOS%
    KEYSHADE PH-9.KEY

TEXTSIZE 0.35
TEXTFONT 1
&SV .YPOS := %.YPOS% - 2.1
MOVE %.XPOS% %.YPOS%
TEXTFILE GP1-7.TXT
  TEXTSIZE 0.26
  TEXTFONT 0
  &SV .YPOS := %.YPOS% - 0.7
  MOVE %.XPOS% %.YPOS%
  TEXTFILE TP3-4.TXT
    &SV .YPOS := %.YPOS% - 0.4
    KEYPOS %.XPOS% %.YPOS%
    KEYSHADE PH-10.KEY
```

```
/* FILE    : GEN-ANNO.AML
/* CONTENT: MACRO TO GENERATE ANNOTATION COVERAGE ANNO-UNIT

GENERATE ANNO-UNIT
LINES
1
532000.000,218450.000
532000.000,330800.000
616600.000,330800.000
616600.000,218450.000
532000.000,218450.000
END
2
540000.000,218450.000
540000.000,218225.000
END
2
560000.000,218450.000
560000.000,218225.000
END
2
580000.000,218450.000
580000.000,218225.000
END
2
600000.000,218450.000
600000.000,218225.000
END
3
532000.000,220000.000
531775.000,220000.000
END
3
532000.000,240000.000
531775.000,240000.000
END
3
532000.000,260000.000
531775.000,260000.000
END
3
532000.000,280000.000
531775.000,280000.000
END
3
532000.000,300000.000
531775.000,300000.000
END
3
532000.000,320000.000
531775.000,320000.000
END
4
540000.000,330800.000
540000.000,331025.000
END
4
560000.000,330800.000
560000.000,331025.000
END
4
580000.000,330800.000
580000.000,331025.000
END
4
600000.000,330800.000
600000.000,331025.000
END
5
616600.000,220000.000
616825.000,220000.000
END
5
616600.000,240000.000
616825.000,240000.000
END
5
616600.000,260000.000
616825.000,260000.000
END
5
616600.000,280000.000
616825.000,280000.000
END
5
616600.000,300000.000
616825.000,300000.000
END
5
616600.000,320000.000
616825.000,320000.000
END
END
QUIT

&RETURN
/* END GEN-ANNO.AML
```

```
PROGRAM NAME: TP-HA.PRG
 10000  PROGRAM SECTION ONE
 10001 REMARK - <TP-HA.PRG> PROGRAM TO CALCULATE TOTAL HA FOR EACH TP-CODE
 10002 FO $NUM1,2,I
 10003 FO $NUM2,1,I
 10004 FO $NUM3,1,I
 10005 FO $NUM5,2,I
 10006 FO $NUM6,1,I
 10007 FO $NUM7,3,I
 10008 FO $NUM8,10,1
 10009 FO $NUM10,5,N,1
 10010 FO $NUM32,1,I
 10011 FO $CHR11,48,C
 10012   FO $NUM18,10,1
 10013   FO $NUM19,3,I
 10014   FO $CHR33,48,C
 10015 FO $CHR21,3,C
 10016 FO $CHR22,7,C
 10017 FO $CHR23,2,C
 10018 FO $CHR24,1,C
 10019 DISP =
 10020 DISP AT 4,5 '.....TP-HA.PRG.....'
 10021 DISP AT 6,5 'THIS PROGRAM CALCULATES THE TOTAL AREA OF TERRAIN PROPERTY'
 10022 DISP AT 7,5 'ATTRIBUTES.  THE  AREA COVERAGE (HA) OF EACH  ATTRIBUTE IS'
 10023 DISP AT 8,5 'WRITTEN TO THE DATAFILE TP?.DBF (TP1.DBF,TP2.DBF ETC). THE'
 10024 DISP AT 9,5 'PROGRAM USES DATAFILES:  STMU.DBF,TU.DBF,SU.DBF,TU-HA.DBF.'
 10025 DISP AT 10,5 'THE FOLLOWING TERRAIN PROPERTIES CAN BE SELECTED:'
 10026 DISP AT 12,5 '                    1) PHYSIOGRAPHY'
 10027 DISP AT 13,5 '                    2) GEOLOGY'
 10028 DISP AT 14,5 '                    3) MAJOR LANDFORM'
 10029 DISP AT 15,5 '                    4) MINOR LANDFORM'
 10030 DISP AT 16,5 '                    5) PARENT MATERIAL'
 10031 DISP AT 17,5 '                    6) SLOPE GRADIENT'
 10032 DISP AT 18,5 '                    7) SUBSTRATUM'
 10033 DISP AT 19,5 '                    8) SUBSURFACE STONINESS'
 10034 DISP AT 20,5 '                    9) SURFACE STONINESS'
 10035 DISP AT 21,5 '                    0) SOIL'
 10036 DISP AT 23,5 'PLEASE ENTER NUMBER TO SELECT: '
 10037 SEL TU.DBF
 10038 ACCEPT AT 23,36 $NUM2
 10039 IF $NUM2 GT 0
 10040   IF $NUM2 EQ 2
 10041     DISP =
 10042     DISP AT 14,5 '.....TP-HA.PRG.....'
 10043     DISP AT 16,5 'THE FOLLOWING GEOLOGIC PROPERTIES CAN BE SELECTED:'
 10044     DISP AT 17,5 '                    1) TP2 - GEOLOGY TP2 CLASS'
 10045     DISP AT 18,5 '                    2) GP1 - GEOLOGIC PROPERTY 1'
 10046     DISP AT 19,5 '                    3) GP2 - GEOLOGIC PROPERTY 2'
 10047     DISP AT 23,5 'PLEASE ENTER NUMBER TO SELECT: '
 10048     CALC $NUM32 = 0
 10049     DO UNTIL $NUM32 GT 0 AND $NUM32 LT 4
 10050       ACCEPT AT 23,36 $NUM32
 10051     DOEND
 10052     IF $NUM32 EQ 1
 10053       CONC $CHR21 'TP2'
 10054       CALC $NUM3 = 0
 10055     ELSE
 10056       IF $NUM32 EQ 2
 10057         CONC $CHR21 'GP1'
 10058         CALC $NUM3 = 0
 10059       ELSE
 10060         CONC $CHR21 'GP2'
 10061         CALC $NUM3 = 1
 10062       ENDIF
 10063     ENDIF
 10064   ELSE
 10065     CONC $CHR21 'TP',$NUM2
 10066     CALC $NUM3 = 1
 10067   ENDIF
 10068 ELSE
 10069   CALC $NUM1 = 10
 10070   CALC $NUM3 = 0
 10071 ENDIF
 10072 DISP AT 23,5 'SKIP CALCULATE TU-HA.DBF? (N): .'
 10073 ACCEPT AT 23,36 $CHR24
 10074 CONC $CHR22 $CHR21,'.DBF'
 10075 IF $CHR24 NE 'Y'
 10076   DISP AT 23,5 'purging old values of  TU-HA.DBF'
 10077   REL TU-HA.DBF 1 BY TU-ID INIT
 10078   CALC $1TU-ID = TU-ID
 10079   CALC $1TPB = 0
 10080   CALC $1TU-HA = 0
 10081   DISP AT 23,5 'calculating ha,   0 % PROCESSED'
 10082   SEL STMU.DBF
 10083   REL TU-HA.DBF 1 BY TU1-ID ORDERED
 10084   CALC $1TU-HA = MU-HA * TU1-PC / 100 + $1TU-HA
 10085   DISP AT 23,5 'calculating ha,   20 % PROCESSED'
 10086   SEL STMU.DBF
 10087   REL TU-HA.DBF 1 BY TU2-ID ORDERED
 10088   CALC $1TU-HA = MU-HA * TU2-PC / 100 + $1TU-HA
 10089   DISP AT 23,5 'calculating ha,   40 % PROCESSED'
 10090   SEL STMU.DBF
 10091   REL TU-HA.DBF 1 BY TU3-ID ORDERED
 10092   CALC $1TU-HA = MU-HA * TU3-PC / 100 + $1TU-HA
 10093   DISP AT 23,5 'calculating ha,   60 % PROCESSED'
 10094   SEL STMU.DBF
 10095   REL TU-HA.DBF 1 BY TU4-ID ORDERED
 10096   CALC $1TU-HA = MU-HA * TU4-PC / 100 + $1TU-HA
 10097   DISP AT 23,5 'calculating ha,   80 % PROCESSED'
 10098   SEL STMU.DBF
 10099   REL TU-HA.DBF 1 BY TU5-ID ORDERED
 10100   CALC $1TU-HA = MU-HA * TU5-PC / 100 + $1TU-HA
 10101   DISP AT 23,5 'calculating ha,  100 % PROCESSED'
 10102 ENDIF
 10103 SEL TU-HA.DBF
 10104 RES BY TU-ID EQ 0
 10105 PURGE
 10106 DISP AT 23,5 'moving TP-code to TU-HA.DBF.....'
 10107 IF $NUM2 EQ 2
 10108   SEL TU.DBF
 10109   RES BY TU-ID GT 0
 10110   REL TP2.DBF 1 BY TP2 ORDERED
 10111   REL TU-HA.DBF 2 BY TU-ID
 10112   IF $NUM3 GT 0
 10113     CON $CHR11 'MOVE $1GP2 TO $2GP2'
 10114   ELSE
 10115     CON $CHR11 'CAL $2',$CHR21,' = $1',$CHR21
 10116   ENDIF
 10117 ELSE
 10118   SEL TU.DBF
 10119   RES BY TU-ID GT 0
 10120   REL TU-HA.DBF 1 BY TU-ID SEQUENTIAL
 10121   IF $NUM3 GT 0
 10122     CONCAT $CHR11 'MOVE ',$CHR21,' TO $1',$CHR21
 10123   ELSE
 10124     IF $NUM2 EQ 0
 10125       CONCAT $CHR11 'CALC $1TP10 = TP10'
 10126     ELSE
 10127       CONCAT $CHR11 'CALC $1',$CHR21,' = ',$CHR21
 10128     ENDIF
 10129   ENDIF
 10130 ENDIF
 20000 PROGRAM SECTION TWO
 20001   EXEC $CHR11
 30000 PROGRAM SECTION THREE
 30001 CALC $NM = 0
 30002 IF $NUM2 GT 0
 30003   CONC $CHR11 'SEL ',$CHR22
 30004   EXEC $CHR11
 30005   CONC $CHR11 'CALC ',$CHR21,'-HA = 0'
 30006   EXEC $CHR11
 30007 ELSE
 30008   SEL SU.DBF
 30009   CALC SU-HA = 0
 30010 ENDIF
 30011 DISP AT 23,5 'calculating ha for TP-codes.....'
 30012 IF $NUM2 GT 0
 30013   SEL TU-HA.DBF
 30014   IF $NUM3 GT 0
 30015     MOVE '99' TO $CHR23
 30016     CONC $CHR11 'RES TP',$NUM2,' NE ',$CHR23
 30017     EXEC $CHR11
 30018   ELSE
 30019     CONC $CHR11 'RES TP',$NUM2,' NE 99'
```

```
30020     EXEC $CHR11
30021   ENDIF
30022   CON $CHR11 'REL ',$CHR22,' 1 BY ',$CHR21,' ORDERED'
30023   EXEC $CHR11
30024 ELSE
30025   SEL TU-HA.DBF
30026   RES TP10 GT 0
30027   RES TP10 NE 99
30028   REMARK - LAKES (TP10 = 0) AND MISSING VALUES (99) ARE EXCLUDED
30029   REL SU.DBF 1 BY TP10 ORDERED
30030 ENDIF
30031 IF $NUM2 GT 0
30032   CONC $CHR11 'CALC $1',$CHR21,'-HA = $1',$CHR21,'-HA + $NUM8'
30033 ELSE
30034   CONC $CHR11 'CALC $1SU-HA = $1SU-HA + $NUM8'
30035 ENDIF
30036 DISP AT 23,5 'RECORD =         '          % PROCESSED
40000 PROGRAM SECTION FOUR
40001 CALC $NUM8 = TU-HA
40002 EXEC $CHR11
40003 CAL $NUM10 = ( $RECNO / $NOREC ) * 100
40004 DISP AT 23,14 $RECNO
40005 DISP AT 23,25 $NUM10
50000 PROGRAM SECTION FIVE
50001 CALC $NM = 0
50002 DISP AT 23,5 '.....PROGRAM READY.....'
```

PROGRAM NAME: TPHA-LST.PRG

```
10000  PROGRAM SECTION ONE
10001 REMARK - <TPHA-LST.PRG> PROGRAM TO LIST AREA COVERAGE IN HA EN %
10002 REMARK - FOR SELECTED TP
10003 DISP =
10004 FO $NUM1,2,I
10005 FO $NUM3,1,I
10006 FO $NUM8,10,1
10007 FO $NUM10,5,N,1
10008 FO $CHR11,48,C
10009 FO $CHR21,5,C
10010 FO $CHR22,48,C
10011 FO $CHR31,3,C
10012 FO $CHR32,3,C
10013 FO $CHR34,4,C
10014 DISP AT 1,2 'PROGRAM TO LIST AREA COVERAGE IN HA AND % FOR SELECTED TP'
10015 DISP AT 3,2 'THERE ARE TWO OPTIONS: '
10016 DISP AT 4,2 '  1) LIST TO SCREEN'
10017 DISP AT 5,2 '  2) LIST TO PRINT'
10018 DISP AT 6,2 'PLEASE ENTER NUMBER TO SELECT: '
10019 ACCEPT AT 6,33 $NUM3
10020 IF $NUM3 EQ 2
10021   MOVE 'PRINT' TO $CHR21
10022 ELSE
10023   MOVE '     ' TO $CHR21
10024 ENDIF
10025 CALC $NUM1 = 0
10026 DISP AT 8,2 'THE FOLLOWING TERRAIN PROPERTIES CAN BE SELECTED:'
10027 DISP AT 10,2 '  1) TP1  - PHYSIOGRAPHY'
10028 DISP AT 11,2 '  2) TP2  - GEOLOGY'
10029 DISP AT 12,2 '  3) TP3  - MAJOR LANDFORM'
10030 DISP AT 13,2 '  4) TP4  - MINOR LANDFORM'
10031 DISP AT 14,2 '  5) TP5  - PARENT MATERIAL'
10032 DISP AT 15,2 '  6) TP6  - SLOPE GRADIENT'
10033 DISP AT 16,2 '  7) TP7  - SUBSTRATUM'
10034 DISP AT 17,2 '  8) TP8  - SUBSURFACE STONINESS'
10035 DISP AT 18,2 '  9) TP9  - SURFACE STONINESS'
10036 DISP AT 19,2 ' 10) TP10 - SOIL'
10037 DISP AT 20,2 ' 11) GP1  - GEOLOGIC PROPERTY 1'
10038 DISP AT 21,2 ' 12) GP2  - GEOLOGIC PROPERTY 2'
10039 DISP AT 23,2 'PLEASE ENTER NUMBER TO SELECT: '
10040 DO UNTIL $NUM1 GT 0 AND $NUM1 LT 13
10041   ACCEPT AT 23,34 $NUM1
10042 DOEND
10043 IF $NUM1 EQ 12
10044   MOVE 'GP2' TO $CHR31
10045 ELSE
10046   IF $NUM1 EQ 11
10047     MOVE 'GP1' TO $CHR31
10048   ELSE
10049     IF $NUM1 EQ 10
10050       FO $CHR36,2,C
10051       MOVE 'SU' TO $CHR36
10052     ELSE
10053       IF $NUM1 EQ 9
10054         MOVE 'TP9' TO $CHR31
10055       ELSE
10056         IF $NUM1 EQ 8
10057           MOVE 'TP8' TO $CHR31
10058         ELSE
10059           IF $NUM1 EQ 7
10060             MOVE 'TP7' TO $CHR31
10061           ELSE
10062             IF $NUM1 EQ 6
10063               MOVE 'TP6' TO $CHR31
10064             ELSE
10065               IF $NUM1 EQ 5
10066                 MOVE 'TP5' TO $CHR31
10067               ELSE
10068                 IF $NUM1 EQ 4
10069                   MOVE 'TP4' TO $CHR31
10070                 ELSE
10071                   IF $NUM1 EQ 3
10072                     MOVE 'TP3' TO $CHR31
10073                   ELSE
10074                     IF $NUM1 EQ 2
10075                       MOVE 'TP2' TO $CHR31
```

```
10076                    ELSE
10077                      MOVE 'TP1' TO $CHR31
10078                    ENDIF
10079                  ENDIF
10080                ENDIF
10081              ENDIF
10082            ENDIF
10083          ENDIF
10084        ENDIF
10085      ENDIF
10086    ENDIF
10087  ENDIF
10088 ENDIF
10089 SEL STMU.DBF
10090 CALC $NUM8 = 0
10091 CALC $NUM8 = $NUM8 + MU-HA
10092 IF $NUM1 EQ 10
10093   FO $CHR35,5,C
10094   MOVE 'SU-ID' TO $CHR35
10095   SEL SU.DBF
10096 ELSE
10097   MOVE $CHR31 TO $CHR32
10098   CONC $CHR11 'SEL ',$CHR31,'.DBF'
10099   EXEC $CHR11
10100 ENDIF
10101 MOVE '     ' TO $CHR34
10102 IF $NUM3 NE 2
10103   DISP ' '
10104   DISP ' '
10105   IF $NUM1 EQ 10                                        SU-HA  AREA-%'
10106     DISP 'SU-ID   SU-NM
10107   ELSE
10108     CONC $CHR11 $CHR31,'           ',$CHR31,'-HA      AREA-%'
10109     DISP $CHR11
10110   ENDIF
10111 ELSE
10112   DISP ' ' PRINT
10113   DISP ' ' PRINT
10114   IF $NUM1 EQ 10                                        SU-HA  AREA-%' PRINT
10115     DISP 'SU-ID   SU-NM
10116   ELSE
10117     CONC $CHR11 $CHR31,'           ',$CHR31,'-HA      AREA-%'
10118     DISP $CHR11 PRINT
10119   ENDIF
10120 ENDIF
20000 PROGRAM SECTION TWO
20001 IF $NUM1 EQ 10
20002   CONC $CHR22 'CALC $NUM10 = SU-HA / $NUM8 * 100'
20003   EXEC $CHR22
20004   CONC $CHR11 'DISP ',$CHR35,',',$CHR36,'-NM,',$CHR36,'-HA,$NUM10 ',$CHR21
20005   EXEC $CHR11
20006 ELSE
20007   CONC $CHR22 'CALC $NUM10 = ',$CHR32,'-HA / $NUM8 * 100'
20008   EXEC $CHR22
20009   CONC $CHR11 'DISP ',$CHR31,',$CHR34,',$CHR32,'-HA,$CHR34,$NUM10 ',$CHR21
20010   EXEC $CHR11
20011 ENDIF
30000 PROGRAM SECTION THREE
40000  PROGRAM END
50000  PROGRAM END
```

PROGRAM NAME: SMASU.PRG

```
10000   PROGRAM SECTION ONE
10001 REMARK - <SMASU.PRG> Program to fill smasu.dbf
10002 REMARK - To force INFO to add records to the related datafile
10003 REMARK - SMASU.DBF the operations MU-ID * 1000, MU-ID / 1000, are
10004 REMARK - executed. Therefore $NUM8 is introduced to keep control
10005 REMARK - on the value of MU-ID. After the processing of a record
10006 REMARK - the MU-ID must have its original value.
10007 REMARK - In datafile TU.DBF item TP10 must must be redfined. The
10008 REMARK - redfined items are ASU1 and ASU2.
10009 SEL SMASU.DBF
10010 PURGE
10011 SEL SMU.DBF
10012 REL SMASU.DBF 1 BY MU-ID APPEND
10013 DISP =
10014 FILES
10015 DISP AT 8,12 '.............PROGRAM TO FILL SMASU.DBF.............'
10016 DISP AT 10,12 'FOR EACH MAPPING UNIT THE DIFFERENT COMBINATIONS OF'
10017 DISP AT 11,12 'TWO SOILTYPES  AND THEIR TU-IDs ARE WRITTEN TO FILE'
10018 DISP AT 12,12 'SMASU.DBF. '
10019 DISP AT 13,12 'FILE SMASU.DBF CAN BE USED TO GENERATE  THE CONTENT'
10020 DISP AT 14,12 'OF FILE ASU.DBF  WHICH GIVES  INFORMATION  ON SOIL-'
10021 DISP AT 15,12 'ASSOCIATIONS AND THEIR OCCURRENCE IN DIFFERENT MUs.'
10022 FO $NUM1,1,I
10023 FO $NUM2,1,I
10024 FO $NUM3,1,I
10025 FO $NUM4,3,I
10026 FO $NUM5,4,5,B,0
10027 FO $NUM6,4,5,B,0
10028 FO $NUM7,5,N,1
10029 FO $NUM8,1,I
10030 FO $NUM32,1,I
10031 FO $NUM33,1,I
10032 FO $NUM34,1,I
10033 FO $CHR11,48,C
20000 PROGRAM SECTION TWO
20001 CALC $NUM1 = 1
20002 CALC $NUM2 = 1
20003   CALC $NUM8 = 1
20004 DO UNTIL $NUM1 EQ 0
20005   CALC $NUM3 = $NUM2 + 1
20006   CONCAT $CHR11 'CALC $NUM4 = SU',$NUM3,'-PC'
20007   EXEC $CHR11
20008   IF $NUM4.GT 0
20009     CONCAT $CHR11 'CALC $NUM5 = SU',$NUM1,'-ID'
20010     EXEC $CHR11
20011     CONCAT $CHR11 'CALC $NUM6 = SU',$NUM3,'-ID'
20012     EXEC $CHR11
20013     IF $NUM2 GT 1
20014       IF $NUM8 EQ 1
20015         CALC MU-ID = MU-ID * 1000
20016       ELSE
20017         CALC MU-ID = MU-ID / 1000
20018       ENDIF
20019     ENDIF
20020     CALC $1MU-ID = MU-ID
20021     IF $NUM5 LE $NUM6
20022       CALC $1ASU1 = $NUM5
20023       CALC $1ASU2 = $NUM6
20024       CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM1,'-ID'
20025       EXEC $CHR11
20026       CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM3,'-ID'
20027       EXEC $CHR11
20028     ELSE
20029       CALC $1ASU1 = $NUM6
20030       CALC $1ASU2 = $NUM5
20031       CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM3,'-ID'
20032       EXEC $CHR11
20033       CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM1,'-ID'
20034       EXEC $CHR11
20035     ENDIF
20036     IF $NUM2 GT 1
20037       IF $NUM8 EQ 1
20038         CALC $1MU-ID = $1MU-ID / 1000
20039         CALC $NUM8 = 0
20040       ELSE
20041         CALC $NUM8 = 1
```

```
20042       ENDIF
20043     ENDIF
20044     IF $NUM2 EQ 2
20045       CALC $NUM32 = 2
20046       CONCAT $CHR11 'CALC $NUM5 = SU',$NUM32,'-ID'
20047       EXEC $CHR11
20048       CONCAT $CHR11 'CALC $NUM6 = SU',$NUM3,'-ID'
20049       EXEC $CHR11
20050       IF $NUM8 EQ 1
20051         CALC MU-ID = MU-ID * 1000
20052       ELSE
20053         CALC MU-ID = MU-ID / 1000
20054       ENDIF
20055       CALC $1MU-ID = MU-ID
20056       IF $NUM5 LT $NUM6
20057         CALC $1ASU1 = $NUM5
20058         CALC $1ASU2 = $NUM6
20059         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM32,'-ID'
20060         EXEC $CHR11
20061         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM3,'-ID'
20062         EXEC $CHR11
20063       ELSE
20064         CALC $1ASU1 = $NUM6
20065         CALC $1ASU2 = $NUM5
20066         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM3,'-ID'
20067         EXEC $CHR11
20068         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM32,'-ID'
20069         EXEC $CHR11
20070       ENDIF
20071       IF $NUM8 EQ 1
20072         CALC $1MU-ID = $1MU-ID / 1000
20073         CALC $NUM8 = 0
20074       ELSE
20075         CALC $NUM8 = 1
20076       ENDIF
20077     ENDIF
20078     IF $NUM2 EQ 3
20079       CALC $NUM33 = 3
20080       CONCAT $CHR11 'CALC $NUM5 = SU',$NUM33,'-ID'
20081       EXEC $CHR11
20082       CONCAT $CHR11 'CALC $NUM6 = SU',$NUM3,'-ID'
20083       EXEC $CHR11
20084       IF $NUM8 EQ 1
20085         CALC MU-ID = MU-ID * 1000
20086       ELSE
20087         CALC MU-ID = MU-ID / 1000
20088       ENDIF
20089       CALC $1MU-ID = MU-ID
20090       IF $NUM5 LE $NUM6
20091         CALC $1ASU1 = $NUM5
20092         CALC $1ASU2 = $NUM6
20093         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM33,'-ID'
20094         EXEC $CHR11
20095         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM3,'-ID'
20096         EXEC $CHR11
20097       ELSE
20098         CALC $1ASU1 = $NUM6
20099         CALC $1ASU2 = $NUM5
20100         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM3,'-ID'
20101         EXEC $CHR11
20102         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM33,'-ID'
20103         EXEC $CHR11
20104       ENDIF
20105       IF $NUM8 EQ 1
20106         CALC $1MU-ID = $1MU-ID / 1000
20107         CALC $NUM8 = 0
20108       ELSE
20109         CALC $NUM8 = 1
20110       ENDIF
20111       CONCAT $CHR11 'CALC $NUM5 = SU',$NUM32,'-ID'
20112       EXEC $CHR11
20113       CONCAT $CHR11 'CALC $NUM6 = SU',$NUM3,'-ID'
20114       EXEC $CHR11
20115       IF $NUM8 EQ 1
20116         CALC MU-ID = MU-ID * 1000
20117       ELSE
20118         CALC MU-ID = MU-ID / 1000
20119       ENDIF
20120       CALC $1MU-ID = MU-ID
20121       IF $NUM5 LE $NUM6
20122         CALC $1ASU1 = $NUM5
20123         CALC $1ASU2 = $NUM6
20124         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM32,'-ID'
20125         EXEC $CHR11
20126         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM3,'-ID'
20127         EXEC $CHR11
20128       ELSE
20129         CALC $1ASU1 = $NUM6
20130         CALC $1ASU2 = $NUM5
20131         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM3,'-ID'
20132         EXEC $CHR11
20133         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM32,'-ID'
20134         EXEC $CHR11
20135       ENDIF
20136       IF $NUM8 EQ 1
20137         CALC $1MU-ID = $1MU-ID / 1000
20138         CALC $NUM8 = 0
20139       ELSE
20140         CALC $NUM8 = 1
20141       ENDIF
20142     ENDIF
20143     IF $NUM2 EQ 4
20144       CALC $NUM34 = 4
20145       CONCAT $CHR11 'CALC $NUM5 = SU',$NUM34,'-ID'
20146       EXEC $CHR11
20147       CONCAT $CHR11 'CALC $NUM6 = SU',$NUM3,'-ID'
20148       EXEC $CHR11
20149       IF $NUM8 EQ 1
20150         CALC MU-ID = MU-ID * 1000
20151       ELSE
20152         CALC MU-ID = MU-ID / 1000
20153       ENDIF
20154       CALC $1MU-ID = MU-ID
20155       IF $NUM5 LE $NUM6
20156         CALC $1ASU1 = $NUM5
20157         CALC $1ASU2 = $NUM6
20158         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM34,'-ID'
20159         EXEC $CHR11
20160         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM3,'-ID'
20161         EXEC $CHR11
20162       ELSE
20163         CALC $1ASU1 = $NUM6
20164         CALC $1ASU2 = $NUM5
20165         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM3,'-ID'
20166         EXEC $CHR11
20167         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM34,'-ID'
20168         EXEC $CHR11
20169       ENDIF
20170       IF $NUM8 EQ 1
20171         CALC $1MU-ID = $1MU-ID / 1000
20172         CALC $NUM8 = 0
20173       ELSE
20174         CALC $NUM8 = 1
20175       ENDIF
20176       CONCAT $CHR11 'CALC $NUM5 = SU',$NUM32,'-ID'
20177       EXEC $CHR11
20178       CONCAT $CHR11 'CALC $NUM6 = SU',$NUM3,'-ID'
20179       EXEC $CHR11
20180       IF $NUM8 EQ 1
20181         CALC MU-ID = MU-ID * 1000
20182       ELSE
20183         CALC MU-ID = MU-ID / 1000
20184       ENDIF
20185       CALC $1MU-ID = MU-ID
20186       IF $NUM5 LE $NUM6
20187         CALC $1ASU1 = $NUM5
20188         CALC $1ASU2 = $NUM6
20189         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM32,'-ID'
20190         EXEC $CHR11
20191         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM3,'-ID'
20192         EXEC $CHR11
20193       ELSE
20194         CALC $1ASU1 = $NUM6
20195         CALC $1ASU2 = $NUM5
```

```
20196         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM3,'-ID'
20197         EXEC $CHR11
20198         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM32,'-ID'
20199         EXEC $CHR11
20200       ENDIF
20201       IF $NUM8 EQ 1
20202         CALC $1MU-ID = $1MU-ID / 1000
20203         CALC $NUM8 = 0
20204       ELSE
20205         CALC $NUM8 = 1
20206       ENDIF
20207       CONCAT $CHR11 'CALC $NUM5 = SU',$NUM33,'-ID'
20208       EXEC $CHR11
20209       CONCAT $CHR11 'CALC $NUM6 = SU',$NUM3,'-ID'
20210       EXEC $CHR11
20211       IF $NUM8 EQ 1
20212         CALC MU-ID = MU-ID * 1000
20213       ELSE
20214         CALC MU-ID = MU-ID / 1000
20215       ENDIF
20216       CALC $1MU-ID = MU-ID
20217       IF $NUM5 LE $NUM6
20218         CALC $1ASU1 = $NUM5
20219         CALC $1ASU2 = $NUM6
20220         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM33,'-ID'
20221         EXEC $CHR11
20222         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM3,'-ID'
20223         EXEC $CHR11
20224       ELSE
20225         CALC $1ASU1 = $NUM6
20226         CALC $1ASU2 = $NUM5
20227         CONCAT $CHR11 'CALC $1ATU1 = TU',$NUM3,'-ID'
20228         EXEC $CHR11
20229         CONCAT $CHR11 'CALC $1ATU2 = TU',$NUM33,'-ID'
20230         EXEC $CHR11
20231       ENDIF
20232       IF $NUM8 EQ 1
20233         CALC $1MU-ID = $1MU-ID / 1000
20234         CALC $NUM8 = 0
20235       ELSE
20236         CALC $NUM8 = 1
20237       ENDIF
20238     ENDIF
20239     CALC $NUM2 = $NUM2 + 1
20240     IF $NUM2 GT 4
20241       CALC $NUM1 = 0
20242       IF $NUM8 EQ 0
20243         CALC MU-ID = MU-ID / 1000
20244       ENDIF
20245     ENDIF
20246   ELSE
20247     CALC $NUM1 = 0
20248     IF $NUM8 EQ 0
20249       CALC MU-ID = MU-ID / 1000
20250     ENDIF
20251   ENDIF
20252 DOEND
20253 CALC $NUM7 = $RECNO / $NOREC * 100
20254 DISP AT 17,12 'RECORD = ',$RECNO,'      ',$NUM7,' % PROCESSED'
30000 PROGRAM SECTION THREE
30001 SEL SMASU.DBF
30002 RES ASU1 GT 1000
30003 PURGE
30004 DISP AT 17,12 '.....................PROGRAM READY.....................'
30005 DISP AT 22,12 ' '
```

PROGRAM NAME: ASU.PRG

```
10000  PROGRAM SECTION ONE
10001 REMARK - <ASU.PRG >PROGRAM TO FILL ASU.DBF
10002 SEL SMASU.DBF
10003 SORT ON ASU1, ASU2, MU-ID
10004 REL ASU.DBF 1 BY ASU12 INIT
10005 DISP =
10006 DISP AT 1,1 ''
10007 FILES
10008 DISP AT 8,12 '.............PROGRAM TO FILL ASU.DBF.............'
10009 DISP AT 10,12 'ALL SOIL ASSOCIATIONS OF SMU.DBF ARE WRITTEN TO THE'
10010 DISP AT 11,12 'DATAFILE ASU.DBF. '
10011 DISP AT 12,12 'THE MAPPING UNITS WHERE EACH ASSOCIATION IS PRESENT'
10012 DISP AT 13,12 'AS WELL AS THE SOIL NAMES ARE INDICATED.'
10013 DISP AT 14,12 'AN INDEX NUMBER TO THE DIFFERENT  SOIL COMBINATIONS'
10014 DISP AT 15,12 'IS GENERATED.'
10015 FO $NUM1,3,I
10016 FO $NUM2,1,I
10017 FO $NUM9,5,N,1
10018 FO $CHR11,48,C
10019 CALC $1ASU-NDX = 0
10020 SEL ASU.DBF
10021 RELATE SMASU.DBF 1 BY ASU12 ORDERED
10022 DISP AT 2,1 '................................................................................'
10023 DISP AT 3,1 '................................................................................'
10024 DISP AT 4,1 '................................................................................'
10025 DISP AT 1,1 ''
10026 FILES
10027 DISP AT 17,12 'writing MUs...  RECORD =       ,        % PROCESSED'
20000 PROGRAM SECTION TWO
20001 CALC $NUM1 = $1MU-ID
20002 CONCAT $CHR11 MU,' ',$NUM1
20003 MOVE $CHR11 TO MU
20004 NEXT
20005 CALC $NUM9 = $RECNO / $NOREC * 100
20006 DISP AT 17,36 $RECNO
20007 DISP AT 17,46 $NUM9
30000 PROGRAM SECTION THREE
30001 SEL ASU.DBF
30002 DISP AT 17,12 'purging phases. RECORD =       ,        % PROCESSED'
40000 PROGRAM SECTION FOUR
40001 IF ASU1 EQ ASU2
40002   CALC ASU1 = 0
40003 ENDIF
40004 CALC $NUM9 = $RECNO / $NOREC * 100
40005 DISP AT 17,36 $RECNO
40006 DISP AT 17,46 $NUM9
50000 PROGRAM SECTION FIVE
50001 RES ASU1 EQ 0
50002 PURGE
50003 REMARK - WATER SOILS (SU-ID = 0) ARE DELETED ALSO
50004 SEL SU.DBF
50005 SORT ON SU-ID
50006 SEL ASU.DBF
50007 RELATE SU.DBF 1 BY ASU1 SEQUENTIAL
50008 DISP AT 2,1 '................................................................................'
50009 DISP AT 3,1 '................................................................................'
50010 DISP AT 4,1 '................................................................................'
50011 DISP AT 1,1 ''
50012 FILES
50013 DISP AT 17,12 'writing ASU-NMs RECORD =       ,        % PROCESSED'
60000 PROGRAM SECTION SIX
60001 MOVE $1SU-NM TO  ASU1-NM
60002 CALC $NUM9 = $RECNO / $NOREC * 50
60003 DISP AT 17,36 $RECNO
60004 DISP AT 17,46 $NUM9
70000 PROGRAM SECTION SEVEN
70001 SEL ASU.DBF
70002 RELATE SU.DBF 1 BY ASU2 ORDERED
70003 DISP AT 2,1 '................................................................................'
70004 DISP AT 3,1 '................................................................................'
70005 DISP AT 4,1 '................................................................................'
70006 DISP AT 1,1 ''
70007 FILES
70008 DISP AT 17,12 'writing ASU-NMs RECORD =       ,        % PROCESSED'
80000 PROGRAM SECTION EIGHT
80001 MOVE $1SU-NM TO  ASU2-NM
```

```
80002 CALC $NUM9 = $RECNO / $NOREC * 50 + 50
80003 DISP AT 17,36 $RECNO
80004 DISP AT 17,46 $NUM9
90000 PROGRAM SECTION NINE
90001 DISP AT 17,12 'generating index numbers.....'
90002 SEL SU.DBF
90003 SORT ON SK6
90004 CALC SU-NDX = $RECNO
90005 RES BY SK1 EQ 'F'
90006 CALC SU-NDX = $RECNO * 10000
90007 ASEL
90008 RES BY SK1 EQ 'M'
90009 CALC SU-NDX = $RECNO * 100
90010 SORT ON SU-ID
90011 SEL ASU.DBF
90012 REL SU.DBF 1 BY ASU1 ORDERED
90013 DISP AT 1,1 ''
90014 REL SU.DBF 2 BY ASU2 ORDERED
90015 DISP AT 1,1 ''
90016 FILES
90017 SORT ON $1SU-NDX, $2SU-NDX
90018 CALC ASU-NDX = $RECNO
90019 SEL SU.DBF
90020 DISP =
90021 DISP AT 8,12 '.............PROCEDURE TO SORT ASU.DBF.............'
90022 DISP AT 10,12 '1)  SORT ON ASU1, ASU2 IN TAXONOMIC ORDER (DEFAULT)'
90023 DISP AT 11,12 '2)  SORT ON ASU2, ASU1 IN TAXONOMIC ORDER'
90024 DISP AT 12,12 '3)  SORT ON ASU1, ASU2 ORDERED TO SU-ID'
90025 DISP AT 13,12 '4)  SORT ON ASU2, ASU1 ORDERED TO SU-ID'
90026 DISP AT 14,12 '5)  SORT ON ASU1-NM, ASU2-NM, ALPHABETICALLY'
90027 DISP AT 15,12 '6)  SORT ON ASU2-NM, ASU1-NM, ALPHABETICALLY'
90028 DISP AT 17,12 'PLEASE ENTER NUMBER TO SELECT:   '
90029 ACCEPT AT 17,43 $NUM2
90030 DISP AT 17,12 'sorting.....'
90031 IF $NUM2 EQ 6
90032   SEL ASU.DBF
90033   REL SU.DBF 1 BY ASU1 ORDERED
90034   DISP AT 1,1 ''
90035   REL SU.DBF 2 BY ASU2 ORDERED
90036   DISP AT 1,1 ''
90037   FILES
90038   SORT ON $2SU-NM, $1SU-NM
90039 ELSE
90040   IF $NUM2 EQ 5
90041     SEL ASU.DBF
90042     REL SU.DBF 1 BY ASU1 ORDERED
90043     DISP AT 1,1 ''
90044     REL SU.DBF 2 BY ASU2 ORDERED
90045     DISP AT 1,1 ''
90046     FILES
90047     SORT ON $1SU-NM, $2SU-NM
90048   ELSE
90049     IF $NUM2 EQ 4
90050       SEL ASU.DBF
90051       REL SU.DBF 1 BY ASU1 ORDERED
90052       DISP AT 1,1 ''
90053       REL SU.DBF 2 BY ASU2 ORDERED
90054       DISP AT 1,1 ''
90055       FILES
90056       SORT ON $2SU-ID, $1SU-ID
90057     ELSE
90058       IF $NUM2 EQ 3
90059         SEL ASU.DBF
90060         REL SU.DBF 1 BY ASU1 ORDERED
90061         DISP AT 1,1 ''
90062         REL SU.DBF 2 BY ASU2 ORDERED
90063         DISP AT 1,1 ''
90064         FILES
90065         SORT ON $1SU-ID, $2SU-ID
90066       ELSE
90067         IF $NUM2 EQ 2
90068           SEL ASU.DBF
90069           REL SU.DBF 1 BY ASU1 ORDERED
90070           DISP AT 1,1 ''
90071           REL SU.DBF 2 BY ASU2 ORDERED
90072           DISP AT 1,1 ''
90073           FILES
90074           SORT ON $2SU-NDX, $1SU-NDX
90075         ENDIF
90076       ENDIF
90077     ENDIF
90078   ENDIF
90079 ENDIF
90080 CALC $NM = 0
90081 DISP AT 17,12 '.....PROGRAM READY.....'
```

PROGRAM NAME: ASU-SRT.PRG

```
10000  PROGRAM SECTION ONE
10001 REMARK PROGRAM TO SORT ASU.DBF
10002 FO $NUM2,1,I
10003 DISP =
10004 DISP AT 8;12 '.............PROCEDURE TO SORT ASU.DBF.............'
10005 DISP AT 10,12 '1)  SORT ON ASU1, ASU2 IN TAXONOMIC ORDER (DEFAULT)'
10006 DISP AT 11,12 '2)  SORT ON ASU2, ASU1 IN TAXONOMIC ORDER'
10007 DISP AT 12,12 '3)  SORT ON ASU1, ASU2 ORDERED TO SU-ID'
10008 DISP AT 13,12 '4)  SORT ON ASU2, ASU1 ORDERED TO SU-ID'
10009 DISP AT 14,12 '5)  SORT ON ASU1-NM, ASU2-NM, ALPHABETICALLY'
10010 DISP AT 15,12 '6)  SORT ON ASU2-NM, ASU1-NM, ALPHABETICALLY'
10011 DISP AT 17,12 'PLEASE ENTER NUMBER TO SELECT:   '
10012 ACCEPT AT 17,43 $NUM2
10013 DISP AT 17,12 'sorting.....................................'
10014 IF $NUM2 EQ 6
10015   SEL ASU.DBF
10016   REL SU.DBF 1 BY ASU1 ORDERED
10017   DISP AT 1,1 ''
10018   REL SU.DBF 2 BY ASU2 ORDERED
10019   DISP AT 1,1 ''
10020   FILES
10021   SORT ON $2SU-NM, $1SU-NM
10022 ELSE
10023   IF $NUM2 EQ 5
10024     SEL ASU.DBF
10025     REL SU.DBF 1 BY ASU1 ORDERED
10026     DISP AT 1,1 ''
10027     REL SU.DBF 2 BY ASU2 ORDERED
10028     DISP AT 1,1 ''
10029     FILES
10030     SORT ON $1SU-NM, $2SU-NM
10031   ELSE
10032     IF $NUM2 EQ 4
10033       SEL ASU.DBF
10034       REL SU.DBF 1 BY ASU1 ORDERED
10035       DISP AT 1,1 ''
10036       REL SU.DBF 2 BY ASU2 ORDERED
10037       DISP AT 1,1 ''
10038       FILES
10039       SORT ON $2SU-ID, $1SU-ID
10040     ELSE
10041       IF $NUM2 EQ 3
10042         SEL ASU.DBF
10043         REL SU.DBF 1 BY ASU1 ORDERED
10044         DISP AT 1,1 ''
10045         REL SU.DBF 2 BY ASU2 ORDERED
10046         DISP AT 1,1 ''
10047         FILES
10048         SORT ON $1SU-ID, $2SU-ID
10049       ELSE
10050         IF $NUM2 EQ 2
10051           SEL ASU.DBF
10052           REL SU.DBF 1 BY ASU1 ORDERED
10053           DISP AT 1,1 ''
10054           REL SU.DBF 2 BY ASU2 ORDERED
10055           DISP AT 1,1 ''
10056           FILES
10057           SORT ON $2SU-NDX, $1SU-NDX
10058         ENDIF
10059       ENDIF
10060     ENDIF
10061   ENDIF
10062 ENDIF
10063 CALC $NM = 0
10064 DISP AT 17,12 '.................PROGRAM READY.................'
```

PROGRAM NAME: ASU-LST.PRG

```
10000  PROGRAM SECTION ONE
10001 REMARK - <ASU-LST.PRG> PROGRAM TO LIST ASSOCIATED SOILS FOR EACH SOIL
10002 SEL ASU-LST.DBF
10003 PURGE
10004 SEL ASU.DBF
10005 REL ASU-LST.DBF 1 BY ASU1 APPEND
10006 DISP =
10007 FILES
10008 FO $NUM1,1,I
10009 FO $CHR11,64,C
10010 FO $CHR21,80,C
10011 DISP AT 8,12 '.........PROGRAM TO LIST ASSOCIATED SOILS.........'
10012 DISP AT 10,12 'FOR EACH SOIL OF DATAFILE SU.DBF THE ASSOCIATED SOILS'
10013 DISP AT 11,12 'AND MAPPING UNITS  WHERE THE ASSOCIATIONS ARE PRESENT'
10014 DISP AT 12,12 '(ITEMS ASU1,ASU2,MU OF DATAFILE ASU.DBF)  ARE LISTED.'
10015 DISP AT 13,12 'THERE ARE TWO OPTIONS:'
10016 DISP AT 14,12 '  1)  LIST TO SCREEN'
10017 DISP AT 15,12 '  2)  LIST TO NSP PRINTFILE'
10018 DISP AT 17,12 'PLEASE ENTER NUMBER TO SELECT: '
10019 ACCEPT AT 17,43 $NUM1
10020 IF $NUM1 EQ 2
10021   CONCAT $CHR11 'DISP ASU1-NM,ASU2-NM,ASU2,ASU-NDX,MU PRINT'
10022 ELSE
10023   CONCAT $CHR11 'DISP ASU1-NM,ASU2-NM,ASU2,ASU-NDX,MU'
10024 ENDIF
10025 DISP AT 17,12 'working.....................................'
10026 DISP AT 17,24 'RECORD = '
20000 PROGRAM SECTION TWO
20001 CALC $1ASU1 = ASU1
20002 CALC $1ASU2 = ASU2
20003 MOVE ASU1-NM TO $1ASU1-NM
20004 MOVE ASU2-NM TO $1ASU2-NM
20005 CALC $1ASU-NDX = ASU-NDX
20006 MOVE MU TO $1MU
20007 DISP AT 17,33 $RECNO
30000 PROGRAM SECTION THREE
30001 SEL ASU.DBF
30002 REL ASU-LST.DBF 1 BY ASU2 APPEND
40000 PROGRAM SECTION FOUR
40001 CALC $1ASU1 = ASU2
40002 CALC $1ASU2 = ASU1
40003 MOVE ASU1-NM TO $1ASU2-NM
40004 MOVE ASU2-NM TO $1ASU1-NM
40005 CALC $1ASU-NDX = ASU-NDX
40006 MOVE MU TO $1MU
40007 DISP AT 17,33 $RECNO
50000 PROGRAM SECTION FIVE
50001 DISP AT 17,12 'sorting.....................................'
50002 SEL ASU-LST.DBF
50003 SORT ON ASU1-NM, ASU2-NM
50004 CONC $CHR21 ' SOIL                          ASSOCIATED SOIL              SU ASU NDX   MU'
50005 IF $NUM1 NE 2
50006   DISP AT 20,1 $CHR21
50007   DISP AT 22,1 ''
50008   EXEC $CHR11
50009 ENDIF
50010 IF $NUM1 EQ 2
50011   DISP ' ' PRINT
50012   DISP '********** LISTING OF ASSOCIATED SOILS FOR EACH SOIL **********'  PRINT
50013   DISP ' ' PRINT
50014   DISP ' ' PRINT
50015   DISP $CHR21 PRINT
50016   DISP ' ' PRINT
50017   EXEC $CHR11
50018   DISP AT 17,12 '.....PROGRAM READY - LISTING WRITTEN TO NSP FILE.....'
50019 ENDIF
```

```
PROGRAM NAME: MSCX-KEY.PRG
 10000  PROGRAM SECTION ONE
 10001 REMARK - PROGRAM <MSCX-KEY.PRG> TO GENERATE KEY FILE <MSCX-E.KEY>
 10002 SEL STMU.DBF
 10003 REL SULUT.DBF BY MU-ID ORDERED
 10004 FORMAT $NUM1,10,1
 10005 FORMAT $NUM2,10,1
 10006 FORMAT $NUM3,10,1
 10007 FORMAT $NUM4,10,1
 10008 FORMAT $NUM5,10,1
 10009 FORMAT $NUM12,10,1
 10010 FORMAT $NUM21,4,1
 10011 FORMAT $NUM22,4,1
 10012 FORMAT $NUM23,4,1
 10013 FORMAT $NUM24,4,1
 10014 FORMAT $NUM25,4,1
 10015 FORMAT $NUM31,1,I
 10016 CAL $NUM1 = 0
 10017 CAL $NUM2 = 0
 10018 CAL $NUM3 = 0
 10019 CAL $NUM4 = 0
 10020 CAL $NUM5 = 0
 10021 CAL $NUM12 = 0
 10022 DISP =
 10023 DISP AT 1,8 'PROGRAM TO GENERATE A KEYFILE FOR ALL SUITABILITY CLASSES'
 10024 DISP AT 5,8 'FOR EACH MAJOR SUITABILITY CLASS THE AREA FOR WHICH IT IS'
 10025 DISP AT 6,8 'PRESENT ON THE MAP IS CALCULATED.'
 10026 DISP AT 8,8 'IF YOU WANT TO CREATE AN ENGLISH KEYFILE ENTER VALUE 1 AT'
 10027 DISP AT 9,8 'THE FOLLOWING QUERY, ENTER 2 TO SELECT SPANISH LANGUAGE.'
 10028 DISP AT 11,16 'PLEASE ENTER NUMBER TO SELECT LANGUAGE: '
 10029 ACCEPT AT 11,56 $NUM31
 10030 DISP =
 10031 DISP AT 1,1 'TOTAL AREAS FOR EACH CLASS ARE BEING CALCULATED'
 10032 DISP AT 3,3 '0% PROCESSED'
 10033 ASEL
 10034 RES MU-ID GT 0
 10035 DISP AT 3,2 '20% PROCESSED'
 10036 CAL $NUM12 = $NUM12 + MU-HA
 10037 ASEL
 10038 CAL $NUM1 = $NUM1 + MU-HA * $1MSC-1 / 100
 10039 DISP AT 3,2 '40% PROCESSED'
 10040 CAL $NUM2 = $NUM2 + MU-HA * $1MSC-2 / 100
 10041 DISP AT 3,2 '60% PROCESSED'
 10042 CAL $NUM3 = $NUM3 + MU-HA * $1MSC-3 / 100
 10043 DISP AT 3,2 '80% PROCESSED'
 10044 CAL $NUM4 = $NUM4 + MU-HA * $1MSC-4 / 100
 10045 DISP AT 3,1 '100% PROCESSED'
 10046 CAL $NUM5 = $NUM5 + MU-HA * $1MSC-5 / 100
 10047 CAL $NUM21 = $NUM1 / $NUM12 * 100
 10048 CAL $NUM22 = $NUM2 / $NUM12 * 100
 10049 CAL $NUM23 = $NUM3 / $NUM12 * 100
 10050 CAL $NUM24 = $NUM4 / $NUM12 * 100
 10051 CAL $NUM25 = $NUM5 / $NUM12 * 100
 10052 DISP =
 10053 IF $NUM31 EQ 1
 10054   COMO [COSTA.COS.ZAN]MSCX-E.KEY
 10055   IF $NUM1 GT 0
 10056     DISP '.1'
 10057     DISP 'QUALIFIED FOR REQUIRING CROPS'
 10058     DISP ' '
 10059     DISP '(',$NUM1,' HA; ',$NUM21,'% TOTAL)'
 10060   ENDIF
 10061   IF $NUM2 GT 0
 10062     DISP '.2'
 10063     DISP 'QUALIFIED FOR MODERATELY REQUIRING'
 10064     DISP 'CROPS'
 10065     DISP '(',$NUM2,' HA; ',$NUM22,'% TOTAL)'
 10066   ENDIF
 10067   IF $NUM3 GT 0
 10068     DISP '.3'
 10069     DISP 'QUALIFIED FOR VERY LITTLE REQUIRING'
 10070     DISP 'CROPS'
 10071     DISP '(',$NUM3,' HA; ',$NUM23,'% TOTAL)'
 10072   ENDIF
 10073   IF $NUM4 GT 0
 10074     DISP '.4'
 10075     DISP 'QUALIFIED FOR STRONGLY RESTRICTED'
 10076     DISP 'AGRICULTURAL USE'
 10077     DISP '(',$NUM4,' HA; ',$NUM24,'% TOTAL)'
 10078   ENDIF
 10079   IF $NUM5 GT 0
 10080     DISP '.5'
 10081     DISP 'QUALIFIED FOR PROTECTION'
 10082     DISP ' '
 10083     DISP '(',$NUM5,' HA; ',$NUM25,'% TOTAL)'
 10084   ENDIF
 10085   COMO END
 10086 ELSE
 10087   COMO [COSTA.COS.ZAN]MSCX-S.KEY
 10088   IF $NUM1 GT 0
 10089     DISP '.1'
 10090     DISP 'APTO PARA CULTIVOS EXIGENTES EN'
 10091     DISP ' CUANTO A FERTILIDAD'
 10092     DISP '(',$NUM1,' HA; ',$NUM21,'% TOTAL)'
 10093   ENDIF
 10094   IF $NUM2 GT 0
 10095     DISP '.2'
 10096     DISP 'APTO PARA CULTIVOS MODERADAMENTE'
 10097     DISP ' EXIGENTES EN CUANTO A FERTILIDAD'
 10098     DISP '(',$NUM2,' HA; ',$NUM22,'% TOTAL)'
 10099   ENDIF
 10100   IF $NUM3 GT 0
 10101     DISP '.3'
 10102     DISP 'CULTIVOS POCO EXIGENTES EN CUANTO'
 10103     DISP 'A FERTILIDAD'
 10104     DISP '(',$NUM3,' HA; ',$NUM23,'% TOTAL)'
 10105   ENDIF
 10106   IF $NUM4 GT 0
 10107     DISP '.4'
 10108     DISP 'USO AGRICOLA MUY RESTRINGIDO POR'
 10109     DISP 'PROFUNDIDAD'
 10110     DISP '(',$NUM4,' HA; ',$NUM24,'% TOTAL)'
 10111   ENDIF
 10112   IF $NUM5 GT 0
 10113     DISP '.5'
 10114     DISP 'NINGUN USO AGRICOLA (PROTECCION)'
 10115     DISP ' '
 10116     DISP '(',$NUM5,' HA; ',$NUM25,'% TOTAL)'
 10117   ENDIF
 10118   COMO END
 10119 ENDIF
 10120 DISP ' '
 10121 DISP ' '
 10122 DISP 'KEYFILE IS ALMOST READY, WARNING:'
 10123 DISP 'DELETE THE FIRST BLANK CHARACTER OF EACH LINE OF THE KEYFILE !'
 10124 END
```

```
PROGRAM NAME: PHYS.PRG
 10000  PROGRAM SECTION ONE
 10001 REMARK - <PHYS.PRG> PROGRAM TO GENERATE KEYFILE FOR PHYSIOGRAPHIC MAP
 10002 FO $NUM1,1,I
 10003 FO $NUM2,1,I
 10004 FO $NUM3,1,I
 10005 FO $NUM4,1,I
 10006 FO $NUM5,1,I
 10007 FO $NUM6,1,I
 10008 FO $NUM8,1,I
 10009 FO $NUM9,1,I
 10010 FO $NUM10,1,I
 10011 FO $NUM11,1,I
 10012 FO $NUM12,1,I
 10013 FO $NUM13,1,I
 10014 FO $NUM14,1,I
 10015 FO $NUM15,1,I
 10016 FO $NUM16,1,I
 10017 FO $NUM17,1,I
 10018 FO $NUM18,2,I
 10019 FO $NUM19,1,I
 10020 FO $NUM20,1,I
 10021 FO $CHR21,3,C
 10022 FO $CHR22,3,C
 10023 FO $CHR23,3,C
 10024 FO $CHR24,3,C
 10025 FO $CHR25,3,C
 10026 FO $CHR26,3,C
 10027 FO $CHR27,8,C
 10028 FO $CHR28,7,C
 10029 FO $CHR29,3,C
 10030 FO $CHR30,7,C
 10031 FO $CHR31,48,C
 10032 FO $CHR37,3,C
 10033 FO $CHR38,5,C
 10034 DISP =
 10035 DISP AT 2,2 '.............PHYS-LEG KEYFILE GENERATION ............'
 10036 DISP AT 4,2 'PROGRAM TO GENERATE KEY-FILE FOR PHYSIOGRAPHIC MAP.'
 10037 DISP AT 5,2 'ENTER NUMBER TO SELECT TERRAIN PROPERTIES.  ENTER 0'
 10038 DISP AT 6,2 'TO END SELECTING.'
 10039 DISP AT 8,2 '  1) TP1 PHYSIOGRAPHY'
 10040 DISP AT 9,2 '  2) GP1 GEOLOGY'
 10041 DISP AT 10,2 '  3) GP2 PERIOD'
 10042 DISP AT 11,2 '  4) TP3 MAJOR LANDFORM'
 10043 DISP AT 12,2 '  5) TP4 MINOR LANDFORM'
 10044 DISP AT 13,2 '  6) TP5 PARENT MATERIAL'
 10045 SEL TU.DBF
 10046 RES $RECNO EQ 1
 10047 CALC $NUM1 = 0
 10048 CALC $NUM2 = 0
 10049 CALC $NUM3 = 0
 10050 CALC $NUM4 = 0
 10051 CALC $NUM5 = 0
 10052 CALC $NUM6 = 0
 10053 REMARK - VARIABLES CAN ALSO BE INITIALISED WITH AID OF A LOOP (SEE BELOW)
 10054 CALC $NUM18 = 11
 10055 DO UNTIL $NUM18 EQ 17
 10056   CONC $CHR31 'CALC $NUM',$NUM18,' = 0'
 10057   EXEC $CHR31
 10058   CALC $NUM18 = $NUM18 + 1
 10059 DOEND
 10060 CALC $NUM18 = 21
 10061 DO UNTIL $NUM18 EQ 27
 10062   CONC $CHR31 'CALC $NUM',$NUM18,' = 0'
 10063   EXEC $CHR31
 10064   CALC $NUM18 = $NUM18 + 1
 10065 DOEND
 10066 SEL TU.DBF
 10067 RES $RECNO EQ 1
 10068 CALC $NUM9 = 1
 10069 CALC $NUM8 = 0
 10070 DO UNTIL $NUM9 EQ 9
 10071   IF $NUM9 EQ 1
 10072     DISP AT 15,2 'ENTER PROPERTY OF FIRST LEVEL:.....'
 10073     ACCEPT AT 15,36 $NUM10
 10074   ELSE
 10075     IF $NUM9 EQ 2
 10076       DISP AT 15,2 'ENTER PROPERTY OF SECOND LEVEL:____'
 10077       ACCEPT AT 15,36 $NUM10
 10078     ELSE
 10079       IF $NUM9 EQ 3
 10080         DISP AT 15,2 'ENTER PROPERTY OF THIRD LEVEL:.....'
 10081         ACCEPT AT 15,36 $NUM10
 10082       ELSE
 10083         IF $NUM9 EQ 4
 10084           DISP AT 15,2 'ENTER PROPERTY OF FOURTH LEVEL:____'
 10085           ACCEPT AT 15,36 $NUM10
 10086         ELSE
 10087           IF $NUM9 EQ 5
 10088             DISP AT 15,2 'ENTER PROPERTY OF FIFTH LEVEL:.....'
 10089             ACCEPT AT 15,36 $NUM10
 10090           ELSE
 10091             IF $NUM9 EQ 6
 10092               DISP AT 15,2 'ENTER PROPERTY OF SIXTH LEVEL:_____'
 10093               ACCEPT AT 15,36 $NUM10
 10094               REMARK - CALC $NUM9 = 8 WILL BE EXECUTED AFTER USE OF RESENT VALUE OF $NUM9
 10095             ENDIF
 10096           ENDIF
 10097         ENDIF
 10098       ENDIF
 10099     ENDIF
 10100   ENDIF
 10101   IF $NUM10 GT 0 AND $NUM10 LT 7
 10102     CONC $CHR31 'CALC $NUM20 = $NUM',$NUM10
 10103     EXEC $CHR31
 10104     IF $NUM20 EQ 0
 10105       REMARK - TERRAIN PROPERTY SELECTED FOR THE FIRST TIME
 10106       CONC $CHR31 'CALC $NUM',$NUM10,' = 1'
 10107       EXEC $CHR31
 10108       CONC $CHR31 'CALC $NUM1',$NUM9,' = ',$NUM10
 10109       EXEC $CHR31
 10110       IF $NUM10 EQ 1
 10111         CONC $CHR31 'FO $CHR2',$NUM9,',3,C'
 10112         EXEC $CHR31
 10113         MOVE 'TP1' TO $CHR37
 10114         CONC $CHR31 'MOVE $CHR37 TO $CHR2',$NUM9
 10115         EXEC $CHR31
 10116       ELSE
 10117         IF $NUM10 EQ 2
 10118           CONC $CHR31 'FO $CHR2',$NUM9,',5,C'
 10119           EXEC $CHR31
 10120           MOVE 'S1GP1' TO $CHR38
 10121           CONC $CHR31 'MOVE $CHR38 TO $CHR2',$NUM9
 10122           EXEC $CHR31
 10123         ELSE
 10124           IF $NUM10 EQ 3
 10125             CONC $CHR31 'FO $CHR2',$NUM9,',5,C'
 10126             EXEC $CHR31
 10127             MOVE 'S1GP2' TO $CHR38
 10128             CONC $CHR31 'MOVE $CHR38 TO $CHR2',$NUM9
 10129             EXEC $CHR31
 10130           ELSE
 10131             IF $NUM10 EQ 4
 10132               CONC $CHR31 'FO $CHR2',$NUM9,',3,C'
 10133               EXEC $CHR31
 10134               MOVE 'TP3' TO $CHR37
 10135               CONC $CHR31 'MOVE $CHR37 TO $CHR2',$NUM9
 10136               EXEC $CHR31
 10137             ELSE
 10138               IF $NUM10 EQ 5
 10139                 CONC $CHR31 'FO $CHR2',$NUM9,',3,C'
 10140                 EXEC $CHR31
 10141                 MOVE 'TP4' TO $CHR37
 10142                 CONC $CHR31 'MOVE $CHR37 TO $CHR2',$NUM9
 10143                 EXEC $CHR31
 10144               ELSE
 10145                 CONC $CHR31 'FO $CHR2',$NUM9,',3,C'
 10146                 EXEC $CHR31
 10147                 MOVE 'TP5' TO $CHR37
 10148                 CONC $CHR31 'MOVE $CHR37 TO $CHR2',$NUM9
 10149                 EXEC $CHR31
 10150               ENDIF
 10151             ENDIF
 10152           ENDIF
```

```
10153         ENDIF
10154       ENDIF
10155     ELSE
10156       REMARK - CASE TERRAIN PROPERTY IS ALREADY SELECTED
10157       CALC $NUM9 = $NUM9 - 1
10158       CALC $NUM8 = $NUM8 - 1
10159     ENDIF
10160     IF $NUM9 EQ 6
10161       CALC $NUM9 = 8
10162     ENDIF
10163   ELSE
10164     IF $NUM10 EQ 0
10165       IF $NUM9 EQ 1
10166         REMARK - CASE 0 IS ENTERED AT SELECTION OF FIRST LEVEL
10167         DISP AT 15,2 'NO LEVELS SELECTED. PROGRAM TERMINATED...'
10168         END
10169       ELSE
10170         REMARK - CASE QUIT ENTERING LEVELS
10171         CALC $NUM9 = 8
10172         CALC $NUM8 = $NUM8 - 1
10173       ENDIF
10174     ELSE
10175       REMARK - CASE OF ILLEGAL (7,8) TERRAIN PROPERTY CODE
10176       CALC $NUM9 = $NUM9 - 1
10177       CALC $NUM8 = $NUM8 - 1
10178     ENDIF
10179   ENDIF
10180   CALC $NUM9 = $NUM9 + 1
10181   CALC $NUM8 = $NUM8 + 1
10182 DOEND
10183 DISP AT 15,2 'sorting TU.DBF to level order......'
10184 CALC $NUM19 = 1
10185 FO $CHR37,5,C
10186 FO $CHR38,24,C
10187 CONC $CHR31 ''
10188 CONC $CHR31 $CHR31,'SORT ON '
10189 DO UNTIL $NUM19 GT $NUM8
10190   CONC $CHR38 'MOVE $CHR2',$NUM19,' TO $CHR37'
10191   EXEC $CHR38
10192   IF $NUM19 EQ 1
10193     CONC $CHR31 $CHR31,' ',$CHR37
10194   ELSE
10195     CONC $CHR31 $CHR31,',',$CHR37
10196   ENDIF
10197   CALC $NUM19 = $NUM19 + 1
10198 DOEND
10199 DISP AT 15,2 'TWO TYPES OF KEYFILES CAN BE GENERATED :'
10200 DISP AT 17,2 '  1) ENGLISH KEYFILE'
10201 DISP AT 18,2 '  2) SPANISH KEYFILE'
10202 DISP AT 20,2 'PLEASE ENTER NUMBER TO SELECT: '
10203 CALC $NUM19 = 0
10204 DO UNTIL $NUM19 EQ 1 OR $NUM19 EQ 2
10205   ACCEPT AT 20,33 $NUM19
10206   IF $NUM19 EQ 1
10207     MOVE 'DESCR-E' TO $CHR28
10208   ELSE
10209     MOVE 'DESCR-S' TO $CHR28
10210   ENDIF
10211 DOEND
10212 DISP AT 15,2 'OUTPUT OF GENERATED KEYFILE IN TWO WAYS:'
10213 DISP AT 17,2 '  1) KEYFILE LISTED TO SCREEN'
10214 DISP AT 18,2 '  2) KEYFILE WRITTEN TO FILE'
10215 DISP AT 20,2 'PLEASE ENTER NUMBER TO SELECT: '
10216 FO $CHR38,16,C
10217 FO $CHR40,6,C
10218 CALC $NUM19 = 0
10219 DO UNTIL $NUM19 EQ 1 OR $NUM19 EQ 2
10220   ACCEPT AT 20,33 $NUM19
10221   IF $NUM19 EQ 1
10222     CALC $NUM17 = 0
10223     MOVE '       ' TO $CHR40
10224   ELSE
10225     CALC $NUM17 = 1
10226     MOVE ' PRINT' TO $CHR40
10227   ENDIF
10228 DOEND
10229 DISP AT 15,2 'OPTION TO ADD SOILNAMES TO THE KEYFILE:'
10230 DISP AT 17,2 '  1) KEYFILE WITH PHYSIOGRAFIC LEVELS AND SOILNAMES'
10231 DISP AT 18,2 '  2) KEYFILE WITH PHYSIOGRAFIC LEVELS ONLY'
10232 DISP AT 20,2 'PLEASE ENTER NUMBER TO SELECT: '
10233 CALC $NUM19 = 0
10234 DO UNTIL $NUM19 EQ 1 OR $NUM19 EQ 2
10235   ACCEPT AT 20,33 $NUM19
10236   IF $NUM19 EQ 1
10237     CALC $NUM10 = $NUM8 + 1
10238   ELSE
10239     CALC $NUM10 = 0
10240   ENDIF
10241 DOEND
10242 SEL TU.DBF
10243 RES TU-ID GT 0
10244 REL TP2.DBF 1 BY TP2
10245 CALC $NM = 1
10246 EXEC $CHR31
10247 CALC $NM = 0
10248 SEL TU.DBF
10249 RES TU-ID GT 0
10250 CALC $NUM19 = 1
10251 REMARK - START LOOP1 (LOOP1 RELATES DATAFILES TO TU.DBF)
10252 LABEL LOOP1
10253   CONC $CHR31 'CALC $NUM18 = $NUM1',$NUM19
10254   EXEC $CHR31
10255   IF $NUM18 EQ 2
10256     CONC $CHR31 'REL GP1-PHYS.DBF ',$NUM19,' BY TP2'
10257     EXEC $CHR31
10258     REMARK - '$CHR2',$NUM19 VALUE = S1GP1 HAS TO BE CHANGED
10259     CONC $CHR38 'S',$NUM19,'GP1'
10260     CONC $CHR31 'MOVE $CHR38 TO $CHR2',$NUM19
10261     EXEC $CHR31
10262   ELSE
10263     IF $NUM18 EQ 3
10264       CONC $CHR31 'REL GP2-PHYS.DBF ',$NUM19,' BY TP2'
10265       EXEC $CHR31
10266       REMARK - '$CHR2',$NUM19 VALUE = S1GP2 HAS TO BE CHANGED
10267       CONC $CHR38 'S',$NUM19,'GP2'
10268       CONC $CHR31 'MOVE $CHR38 TO $CHR2',$NUM19
10269       EXEC $CHR31
10270     ELSE
10271       CONC $CHR31 'CONC $CHR29 $CHR2',$NUM19
10272       EXEC $CHR31
10273       CONC $CHR30 $CHR29,'.DBF'
10274       CONC $CHR31 'REL ',$CHR30,' ',$NUM19,' BY ',$CHR29
10275       EXEC $CHR31
10276     ENDIF
10277   ENDIF
10278   IF $NUM19 LT $NUM8
10279     IF $NUM19 EQ 1
10280       CALC $NUM19 = 2
10281     ELSE
10282       IF $NUM19 EQ 2
10283         CALC $NUM19 = 3
10284       ELSE
10285         IF $NUM19 EQ 3
10286           CALC $NUM19 = 4
10287         ELSE
10288           IF $NUM19 EQ 4
10289             CALC $NUM19 = 5
10290           ELSE
10291             CALC $NUM19 = 6
10292           ENDIF
10293         ENDIF
10294       ENDIF
10295     ENDIF
10296     GOTO LOOP1
10297   ENDIF
10298 REMARK - $NUM10 IS USED AS RELATE NUMBER TO RELATE SU.DBF TO TU.DBF
10299 IF $NUM10 GT 0
10300   CONC $CHR31 'REL SU.DBF ',$NUM10,' BY TP10'
10301   EXEC $CHR31
10302 ENDIF
10303 REMARK - END OF LOOP1
10304 FO $CHR37,8,C
10305 DISP AT 15,2 'OPTION TO SELECT A SUBSET OF TERRAIN UNITS'
10306 DISP AT 17,2 'ANSWER QUESTIONS OR  ELSE GIVE <RETURN> TO CONTINUE'
```

```
10307 DISP AT 18,2 '................................................'
10308 DISP AT 19,2 'ENTER FILENAME:.................'
10309 DISP AT 20,2 'ENTER RELATE ITEM:.............'
10310 MOVE '                              ' TO $CHR38
10311 MOVE '         ' TO $CHR37
10312 CALC $NUM19 = 0
10313 DO UNTIL $NUM19 EQ 1 OR $NUM19 EQ 2
10314   ACCEPT AT 19,34 $CHR38
10315   IF $CHR38 EQ '                              '
10316     CALC $NUM19 = 2
10317   ELSE
10318     CALC $NUM19 = 1
10319   ENDIF
10320 DOEND
10321 IF $NUM19 EQ 1 OR $NUM19 EQ 2
10322   ACCEPT AT 20,34 $CHR37
10323   IF $CHR37 EQ '      '
10324     CALC $NUM19 = 2
10325   ELSE
10326     CALC $NUM19 = 1
10327   ENDIF
10328 ENDIF
10329 IF $NUM19 EQ 1
10330   CALC $NM = 1
10331   CALC $NUM1 = $NUM8 + 2
10332   CONC $CHR31 'REL ',$CHR38,' ',$NUM1,' BY ',$CHR37
10333   EXEC $CHR31
10334   CONC $CHR31 'RES $',$NUM1,$CHR37,' LT 200'
10335   EXEC $CHR31
10336   CALC $NM = 0
10337 ENDIF
10338 FO $NUM1,2,I
10339 FO $NUM2,2,I
10340 FO $NUM3,2,I
10341 FO $NUM4,2,I
10342 FO $NUM5,2,I
10343 FO $NUM6,2,I
10344 FO $NUM11,2,I
10345 FO $NUM12,2,I
10346 FO $NUM13,2,I
10347 FO $NUM14,2,I
10348 FO $NUM15,2,I
10349 FO $NUM16,2,I
10350 FO $NUM18,3,I
10351 FO $NUM20,3,I
10352 FO $CHR27,8,C
10353 FO $CHR38,16,C
10354 FO $CHR31,56,C
10355 CALC $NUM1 = 0
10356 CALC $NUM2 = 0
10357 CALC $NUM3 = 0
10358 CALC $NUM4 = 0
10359 CALC $NUM5 = 0
10360 CALC $NUM6 = 0
10361 CALC $NUM11 = 0
10362 CALC $NUM12 = 0
10363 CALC $NUM13 = 0
10364 CALC $NUM14 = 0
10365 CALC $NUM15 = 0
10366 CALC $NUM16 = 0
10367 MOVE '         ' TO $CHR27
10368 IF $NUM17 EQ 1
10369   OUTPUT PHYS.KEY
10370 ELSE
10371   DISP ' '
10372   DISP ' '
10373   DISP ' '
10374 ENDIF
10375 CALC $NM = 1
20000 PROGRAM SECTION TWO
20001 CALC $NUM19 = 1
20002 REMARK - FORMAT OF $NUM18 TO AVOID DISPLAY OF '.  1' INSTEAD OF '.1'
20003 REMARK - LOOP POSITION CAN'T AVOID EXECUTION OF THE FO COMMAND
20004 REMARK IF $NUM20 GT 99
20005 REMARK   FO $NUM18,3,I
20006 REMARK ELSE
20007 REMARK   IF $NUM20 GT 9
20008 REMARK     FO $NUM18,2,I
20009 REMARK   ELSE
20010 REMARK     FO $NUM18,1,I
20011 REMARK   ENDIF
20012 REMARK ENDIF
20013 REMARK CALC $NUM18 = $NUM20
20014 CALC $NUM18 = TU-ID
20015 REMARK - LOOP
20016 DO UNTIL $NUM19 GT $NUM8
20017   CON $CHR31 'CONC $CHR38 $CHR2',$NUM19
20018   EXEC $CHR31
20019   CONC $CHR31 'CALC $NUM',$CHR19,' = ',$CHR38
20020   EXEC $CHR31
20021   CALC $NUM19 = $NUM19 + 1
20022 DOEND
20023 REMARK - CHECKING CHANGE OF TP OF LEVEL 1 COMPARED TO LAST RECORD
20024 IF $NUM1 NE $NUM11
20025   GOTO LEVEL1
20026 ELSE
20027   REMARK - CHECKING CHANGE OF TP OF LEVEL 2 COMPARED TO LAST RECORD
20028   IF $NUM2 NE $NUM12
20029     GOTO LEVEL2
20030   ELSE
20031     REMARK - CHECKING CHANGE OF TP OF LEVEL 3 COMPARED TO LAST RECORD
20032     IF $NUM3 NE $NUM13
20033       GOTO LEVEL3
20034     ELSE
20035       REMARK - CHECKING CHANGE OF TP OF LEVEL 4 COMPARED TO LAST RECORD
20036       IF $NUM4 NE $NUM14
20037         GOTO LEVEL4
20038       ELSE
20039         REMARK - CHECKING CHANGE OF TP OF LEVEL 5 COMPARED TO LAST RECORD
20040         IF $NUM5 NE $NUM15
20041           GOTO LEVEL5
20042         ELSE
20043           REMARK - CHECKING CHANGE OF TP OF LEVEL 6 COMPARED TO LAST RECORD
20044           IF $NUM6 NE $NUM16
20045             GOTO LEVEL6
20046           ELSE
20047             GOTO LEVEL7
20048           ENDIF
20049         ENDIF
20050       ENDIF
20051     ENDIF
20052   ENDIF
20053 ENDIF
20054 LABEL LEVEL1
20055 CONC $CHR38 'S1',$CHR28
20056 CONC $CHR31 'DISP ',$CHR38,$CHR40
20057 EXEC $CHR31
20058 IF $NUM8 EQ 1
20059   CONC $CHR38 '.',$NUM18
20060   CONC $CHR31 'DISP $CHR38',$CHR40
20061   EXEC $CHR31
20062 ENDIF
20063 LABEL LEVEL2
20064 IF $NUM8 GE 2
20065   FO $CHR27,1,C
20066   CONC $CHR38 'S2',$CHR28
20067   CONC $CHR31 'DISP $CHR27,',$CHR38,$CHR40
20068   EXEC $CHR31
20069   IF $NUM8 EQ 2
20070     CONC $CHR38 '.',$NUM18
20071     CONC $CHR31 'DISP $CHR38',$CHR40
20072     EXEC $CHR31
20073   ENDIF
20074 ENDIF
20075 LABEL LEVEL3
20076 IF $NUM8 GE 3
20077   FO $CHR27,3,C
20078   CONC $CHR38 'S3',$CHR28
20079   CONC $CHR31 'DISP $CHR27,',$CHR38,$CHR40
20080   EXEC $CHR31
20081   IF $NUM8 EQ 3
20082     CONC $CHR38 '.',$NUM18
20083     CONC $CHR31 'DISP $CHR38',$CHR40
20084     EXEC $CHR31
```

```
20085   ENDIF
20086 ENDIF
20087 LABEL LEVEL4
20088 IF $NUM8 GE 4
20089   FO $CHR27,5,C
20090   CONC $CHR38 '$4',$CHR28
20091   CONC $CHR31 'DISP $CHR27,',$CHR38,$CHR40
20092   EXEC $CHR31
20093   IF $NUM8 EQ 4
20094     CONC $CHR38 '.',$NUM18
20095     CONC $CHR31 'DISP $CHR38',$CHR40
20096     EXEC $CHR31
20097   ENDIF
20098 ENDIF
20099 LABEL LEVEL5
20100 IF $NUM8 GE 5
20101   FO $CHR27,7,C
20102   CONC $CHR38 '$5',$CHR28
20103   CONC $CHR31 'DISP $CHR27,',$CHR38,$CHR40
20104   EXEC $CHR31
20105   IF $NUM8 EQ 5
20106     CONC $CHR38 '.',$NUM18
20107     CONC $CHR31 'DISP $CHR38',$CHR40
20108     EXEC $CHR31
20109   ENDIF
20110 ENDIF
20111 LABEL LEVEL6
20112 IF $NUM8 GE 6
20113   FO $CHR27,8,C
20114   CONC $CHR38 '$6',$CHR28
20115   CONC $CHR31 'DISP $CHR27,',$CHR38,$CHR40
20116   EXEC $CHR31
20117   IF $NUM8 EQ 6
20118     CONC $CHR38 '.',$NUM18
20119     CONC $CHR31 'DISP $CHR38',$CHR40
20120     EXEC $CHR31
20121   ENDIF
20122 ENDIF
20123 LABEL LEVEL7
20124 IF $NUM10 GT 0
20125   CONC $CHR31 'DISP $CHR27,$',$NUM10,'SU-NM,$',$NUM10,'SK6 ',$CHR40
20126   EXEC $CHR31
20127 ENDIF
20128 CALC $NUM19 = 1
20129 DO UNTIL $NUM19 GT $NUM8
20130   CON $CHR31 'CONC $CHR38 $CHR2',$NUM19
20131   EXEC $CHR31
20132   CONC $CHR31 'CALC $NUM1',$NUM19,' = ',$CHR38
20133   EXEC $CHR31
20134   CALC $NUM19 = $NUM19 + 1
20135 DOEND
20136 IF $NUM17 EQ 1
20137   DISP AT 20,2 'Writing key attributes to keyfile, RECORD = ',$RECNO
20138 ENDIF
30000 PROGRAM SECTION THREE
30001 IF $NUM17 EQ 1
30002   OUTPUT END
30003   DISP AT 15,2 '.....'
30004   DISP AT 16,2 '.....'
30005   DISP AT 17,2 '.....'
30006   DISP AT 18,2 '.....'
30007   DISP AT 19,2 '.....'
30008   DISP AT 20,2 '....PROGRAM READY - KEYFILE WRITTEN TO PHYS.KEY....'
30009 ENDIF
30010 CALC $NM = 0
30011 END
```

PROGRAM NAME: LEG.PRG

```
10000  PROGRAM SECTION ONE
10001 REMARK - <LEG.PRG> PROGRAM TO GENERATE LEGEND STRUCTURES
10002 REMARK - WITH AN OPTION TO SELECT ITEMS OF TU.DBF AND SU.DBF
10003 FO $NUM1,1,I
10004 FO $NUM2,1,I
10005 FO $NUM3,1,I
10006 FO $NUM4,1,I
10007 FO $NUM5,1,I
10008 FO $NUM6,1,I
10009 FO $NUM8,1,I
10010 FO $NUM9,1,I
10011 FO $NUM10,1,I
10012 FO $NUM11,1,I
10013 FO $NUM12,1,I
10014 FO $NUM13,1,I
10015 FO $NUM14,1,I
10016 FO $NUM15,1,I
10017 FO $NUM16,1,I
10018 FO $NUM17,1,I
10019 FO $NUM18,2,I
10020 FO $NUM19,1,I
10021 FO $NUM20,1,I
10022 FO $CHR21,8,C
10023 FO $CHR22,8,C
10024 FO $CHR23,8,C
10025 FO $CHR24,8,C
10026 FO $CHR25,8,C
10027 FO $CHR26,8,C
10028 FO $CHR27,8,C
10029 FO $CHR28,8,C
10030 FO $CHR29,8,C
10031 FO $CHR30,7,C
10032 FO $CHR31,48,C
10033 FO $CHR37,8,C
10034 FO $CHR38,8,C
10035 DISP =
10036 DISP AT 1,2 '.....LEGEND STRUCTURE GENERATION .....'
10037 DISP AT 3,2 'THIS PROGRAM ALLOWS TO  GENERATE A LEGEND STRUCTURE'
10038 DISP AT 4,2 'WITH A  SELECTION OF ITEMS  OF DATAFILES TU.DBF AND'
10039 DISP AT 5,2 'SU.DBF AS KEYLEVELS. YOU CAN ENTER TWO VALID CODES:'
10040 DISP AT 6,2 '1 OR 2, PRESS <ENTER> TO FINISH SELECTIONS'
10041 DISP AT 8,2 'TO SELECT TU.DBF:  1,   TO SELECT SU.DBF:  2'
10042 SEL TU.DBF
10043 RES $RECNO EQ 1
10044 CALC $NUM19 = 0
10045 CALC $NUM8 = 0
10046 CALC $NUM2 = 1
10047 CALC $NUM3 = 0
10048 DO UNTIL $NUM19 EQ 1
10049   CALC $NUM8 = $NUM8 + 1
10050   MOVE '          ' TO $CHR37
10051   DISP AT 10,2 'ENTER FILE CODE:.....'
10052   DISP AT 11,2 'ENTER KEY ITEM NAME:...'
10053   ACCEPT AT 10,25 $NUM3
10054   ACCEPT AT 11,25 $CHR37
10055 REMARK - DISP AT 12,5 '$NUM3 = ',$NUM3,',  $CHR37 = ',$CHR37
10056   IF $NUM3 EQ 2
10057     MOVE 'SU.DBF' TO $CHR38
10058     CONC $CHR31 'CALC $NUM1',$NUM8,' =  2'
10059     EXEC $CHR31
10060   ELSE
10061     MOVE 'TU.DBF' TO $CHR38
10062     CONC $CHR31 'CALC $NUM1',$NUM8,' =  1'
10063     EXEC $CHR31
10064   ENDIF
10065   IF $CHR37 EQ '          '
10066     CALC $NUM19 = 1
10067     REMARK - NOTHING SELECTED SO $NUM8 SHOULDN'T HAVE CHANGED
10068     CALC $NUM8 = $NUM8 - 1
10069   ELSE
10070     CONC $CHR31 'MOVE $CHR37 TO $CHR2',$NUM8
10071     EXEC $CHR31
10072   ENDIF
10073   IF $NUM8 EQ 7
10074     REMARK - SU.DBF IS RELATED TO TU.DBF, IF A  MAXIMUM
10075     REMARK - OF SEVEN FILES IS RELATED TO TU.DBF THEN
```

```
10076     REMARK - IT WILL BE POSSIBLE TO RELATE AN PATFILE ALSO
10077     CALC $NUM19 = 1
10078   ENDIF
10079 DOEND
10080 DISP AT 15,2 'sorting TU.DBF to level order.....'
10081 CALC $NUM2 = 1
10082 FO $CHR37,5,C
10083 FO $CHR38,24,C
10084 CONC $CHR31 ''
10085 CONC $CHR31 $CHR31,'SORT ON '
10086 DO UNTIL $NUM2 GT $NUM8
10087   CONC $CHR38 'MOVE $CHR2',$NUM2,' TO $CHR37'
10088   EXEC $CHR38
10089   CONC $CHR38 'CALC $NUM3 = $CHR1',$NUM2
10090   EXEC $CHR38
10091   IF $NUM2 EQ 1
10092     IF $NUM3 EQ 2
10093       REMARK - ITEM OF SU.DBF SELECTED
10094       CONC $CHR31 $CHR31,' S9',$CHR37
10095     ELSE
10096       CONC $CHR31 $CHR31,' ',$CHR37
10097     ENDIF
10098   ELSE
10099     IF $NUM3 EQ 2
10100       CONC $CHR31 $CHR31,',S9',$CHR37
10101     ELSE
10102       CONC $CHR31 $CHR31,',',$CHR37
10103     ENDIF
10104   ENDIF
10105   CALC $NUM2 = $NUM2 + 1
10106 REMARK - DISP AT 21,2 '$NUM2 = ',$NUM2,',  $NUM8 = ',$NUM8
10107 REMARK - DISP AT 22,5 '$CHR31 = ',$CHR31
10108 DOEND
10109 DISP AT 15,2 'TWO TYPES OF KEYFILES CAN BE GENERATED :'
10110 DISP AT 17,2 '  1) ENGLISH KEYFILE'
10111 DISP AT 18,2 '  2) SPANISH KEYFILE'
10112 DISP AT 20,2 'PLEASE ENTER NUMBER TO SELECT: '
10113 CALC $NUM19 = 0
10114 DO UNTIL $NUM19 EQ 1 OR $NUM19 EQ 2
10115   ACCEPT AT 20,33 $NUM19
10116   IF $NUM19 EQ 1
10117     MOVE 'DESCR-E' TO $CHR28
10118   ELSE
10119     MOVE 'DESCR-S' TO $CHR28
10120   ENDIF
10121 DOEND
10122 DISP AT 15,2 'OUTPUT OF GENERATED KEYFILE IN TWO WAYS:'
10123 DISP AT 17,2 '  1) KEYFILE LISTED TO SCREEN'
10124 DISP AT 18,2 '  2) KEYFILE WRITTEN TO FILE'
10125 DISP AT 20,2 'PLEASE ENTER NUMBER TO SELECT: '
10126 FO $CHR38,16,C
10127 FO $CHR40,6,C
10128 CALC $NUM19 = 0
10129 DO UNTIL $NUM19 EQ 1 OR $NUM19 EQ 2
10130   ACCEPT AT 20,33 $NUM19
10131   IF $NUM19 EQ 1
10132     MOVE '       ' TO $CHR40
10133   ELSE
10134     MOVE ' PRINT' TO $CHR40
10135   ENDIF
10136 DOEND
10137 DISP AT 15,2 'OPTION TO ADD SOILNAMES TO THE KEYFILE:'
10138 DISP AT 17,2 '  1) KEYFILE WITH SELECTED KEYLEVELS AND SOILNAMES'
10139 DISP AT 18,2 '  2) KEYFILE WITH SELECTED KEYLEVELS ONLY'
10140 DISP AT 20,2 'PLEASE ENTER NUMBER TO SELECT: '
10141 CALC $NUM19 = 0
10142 DO UNTIL $NUM19 EQ 1 OR $NUM19 EQ 2
10143   ACCEPT AT 20,33 $NUM19
10144   IF $NUM19 EQ 1
10145     REMARK - $NUM10 IS USED AS RELATE NUMBER TO RELATE SU.DBF TO TU.DBF
10146     CALC $NUM10 = 9
10147   ELSE
10148     CALC $NUM10 = 0
10149   ENDIF
10150 DOEND
10151 SEL TU.DBF
10152 RES TU-ID GT 0
10153 REL SU.DBF 9 BY TP10
10154 CALC $NM = 1
10155 EXEC $CHR31
10156 CALC $NM = 0
10157 FO $CHR37,8,C
10158 DISP AT 15,2 'OPTION TO SELECT A SUBSET OF TERRAIN UNITS. ENTER A'
10159 DISP AT 16,2 'PAT-file NAME (NEG.PAT) AND AN ITEM NAME (TU1-ID OR'
10160 DISP AT 17,2 'TU2-ID ETC.). LEGEND WILL BE BASED ON AVAILABLE TUs'
10161 DISP AT 18,2 'ANSWER QUESTIONS OR  ELSE GIVE <RETURN> TO CONTINUE'
10162 DISP AT 19,2 'ENTER FILENAME:.....'
10163 DISP AT 20,2 'ENTER RELATE ITEM:.....'
10164 MOVE '                    ' TO $CHR38
10165 MOVE '        ' TO $CHR37
10166 CALC $NUM19 = 0
10167 DO UNTIL $NUM19 EQ 1 OR $NUM19 EQ 2
10168   ACCEPT AT 19,34 $CHR38
10169   IF $CHR38 EQ '                    '
10170     CALC $NUM19 = 2
10171   ELSE
10172     CALC $NUM19 = 1
10173   ENDIF
10174 DOEND
10175 IF $NUM19 EQ 1 OR $NUM19 EQ 2
10176   ACCEPT AT 20,34 $CHR37
10177   IF $CHR37 EQ '        '
10178     CALC $NUM19 = 2
10179   ELSE
10180     CALC $NUM19 = 1
10181   ENDIF
10182 ENDIF
10183 IF $NUM19 EQ 1
10184   CALC $NM = 1
10185   CALC $NUM1 = $NUM8 + 2
10186   CONC $CHR31 'REL ',$CHR38,' ',$NUM1,' BY ',$CHR37
10187   EXEC $CHR31
10188   CONC $CHR31 'RES S',$NUM1,$CHR37,' LT 200'
10189   EXEC $CHR31
10190   CALC $NM = 0
10191 ENDIF
10192 CALC $NUM2 = 1
10193 REMARK - START OF LOOP1 ( LOOP1 RELATES DATAFILES TO TU.DBF)
10194 FO $CHR30,16,C
10195 FO $CHR32,40,C
10196 LABEL LOOP1
10197   CONC $CHR32 'CALC $NUM3 = $CHR1',$NUM2
10198   EXEC $CHR32
10199   CONC $CHR32 'CONC $CHR29 $CHR2',$NUM2
10200   EXEC $CHR32
10201   IF $CHR29 EQ 'TP2'
10202     REMARK - TP22.DBF = GP1.DBF + TP2-ITEM
10203     MOVE 'TP22.DBF' TO $CHR30
10204   ELSE
10205     CONC $CHR30 $CHR29,'.DBF'
10206   ENDIF
10207   IF $NUM3 = 2
10208     CONC $CHR32 'REL ',$CHR30,' ',$NUM2,' BY S9',$CHR29
10209     EXEC $CHR32
10210   ELSE
10211     CONC $CHR32 'REL ',$CHR30,' ',$NUM2,' BY ',$CHR29
10212     EXEC $CHR32
10213   ENDIF
10214   IF $NUM2 LT $NUM8
10215     IF $NUM2 EQ 1
10216       CALC $NUM2 = 2
10217     ELSE
10218       IF $NUM2 EQ 2
10219         CALC $NUM2 = 3
10220       ELSE
10221         IF $NUM2 EQ 3
10222           CALC $NUM2 = 4
10223         ELSE
10224           IF $NUM2 EQ 4
10225             CALC $NUM2 = 5
10226           ELSE
10227             IF $NUM2 EQ 5
10228               CALC $NUM2 = 6
10229             ELSE
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10230              CALC $NUM2 = 7
10231            ENDIF
10232          ENDIF
10233        ENDIF
10234      ENDIF
10235    ENDIF
10236    GOTO LOOP1
10237  ENDIF
10238 REMARK - END OF LOOP1
10239 FO $NUM1,2,I
10240 FO $NUM2,2,I
10241 FO $NUM3,2,I
10242 FO $NUM4,2,I
10243 FO $NUM5,2,I
10244 FO $NUM6,2,I
10245 FO $NUM7,2,I
10246 FO $NUM11,2,I
10247 FO $NUM12,2,I
10248 FO $NUM13,2,I
10249 FO $NUM14,2,I
10250 FO $NUM15,2,I
10251 FO $NUM16,2,I
10252 FO $NUM17,2,I
10253 FO $NUM18,3,I
10254 FO $CHR18,16,C
10255 FO $CHR27,8,C
10256 FO $CHR30,1,C
10257 FO $CHR38,16,C
10258 FO $CHR31,56,C
10259 CALC $NUM1 = 0
10260 CALC $NUM2 = 0
10261 CALC $NUM3 = 0
10262 CALC $NUM4 = 0
10263 CALC $NUM5 = 0
10264 CALC $NUM6 = 0
10265 CALC $NUM7 = 0
10266 CALC $NUM11 = 0
10267 CALC $NUM12 = 0
10268 CALC $NUM13 = 0
10269 CALC $NUM14 = 0
10270 CALC $NUM15 = 0
10271 CALC $NUM16 = 0
10272 CALC $NUM17 = 0
10273 MOVE '                ' TO $CHR19
10274 IF $CHR40 EQ ' PRINT'
10275   OUTPUT LEG.KEY
10276 ELSE
10277   DISP ' '
10278   DISP ' '
10279   DISP ' '
10280 ENDIF
10281 CALC $NM = 1
20000 PROGRAM SECTION TWO
20001 CALC $NUM9 = 1
20002 CALC $NUM18 = TU-ID
20003 REMARK - LOOP
20004 DO UNTIL $NUM9 GT $NUM8
20005   CON $CHR31 'MOVE $CHR2',$NUM9,' TO $CHR30'
20006   EXEC $CHR31
20007   CON $CHR31 'CONC $CHR38 $CHR2',$NUM9
20008   EXEC $CHR31
20009   IF $CHR30 EQ 'I'
20010     CONC $CHR31 'CALC $NUM',$NUM9,' = ',$CHR38
20011     EXEC $CHR31
20012   ELSE
20013     CONC $CHR31 'CALC $NUM',$NUM9,' = $9',$CHR38
20014     EXEC $CHR31
20015   ENDIF
20016   CALC $NUM9 = $NUM9 + 1
20017 DOEND
20018 REMARK - CHECKING CHANGE OF TP OF LEVEL 1 COMPARED TO LAST RECORD
20019 IF $NUM1 NE $NUM11
20020   GOTO LEVEL1
20021 ELSE
20022   REMARK - CHECKING CHANGE OF TP OF LEVEL 2 COMPARED TO LAST RECORD
20023   IF $NUM2 NE $NUM12
20024     GOTO LEVEL2
20025   ELSE
20026     REMARK - CHECKING CHANGE OF TP OF LEVEL 3 COMPARED TO LAST RECORD
20027     IF $NUM3 NE $NUM13
20028       GOTO LEVEL3
20029     ELSE
20030       REMARK - CHECKING CHANGE OF TP OF LEVEL 4 COMPARED TO LAST RECORD
20031       IF $NUM4 NE $NUM14
20032         GOTO LEVEL4
20033       ELSE
20034         REMARK - CHECKING CHANGE OF TP OF LEVEL 5 COMPARED TO LAST RECORD
20035         IF $NUM5 NE $NUM15
20036           GOTO LEVEL5
20037         ELSE
20038           REMARK - CHECKING CHANGE OF TP OF LEVEL 6 COMPARED TO LAST RECORD
20039           IF $NUM6 NE $NUM16
20040             GOTO LEVEL6
20041           ELSE
20042             REMARK - CHECKING CHANGE OF TP OF LEVEL 7 COMPARED TO LAST RECORD
20043             IF $NUM6 NE $NUM16
20044               GOTO LEVEL7
20045             ELSE
20046               GOTO LEVEL8
20047             ENDIF
20048           ENDIF
20049         ENDIF
20050       ENDIF
20051     ENDIF
20052   ENDIF
20053 ENDIF
20054 LABEL LEVEL1
20055 CONC $CHR38 'S1',$CHR28
20056 CONC $CHR31 'DISP ',$CHR38,$CHR40
20057 EXEC $CHR31
20058 IF $NUM8 EQ 1
20059   CONC $CHR38 '.',$NUM18
20060   CONC $CHR31 'DISP $CHR38',$CHR40
20061   EXEC $CHR31
20062 ENDIF
20063 LABEL LEVEL2
20064 IF $NUM8 GE 2
20065   FO $CHR19,1,C
20066   CONC $CHR38 'S2',$CHR28
20067   CONC $CHR31 'DISP $CHR19,',$CHR38,$CHR40
20068   EXEC $CHR31
20069   IF $NUM8 EQ 2
20070     CONC $CHR38 '.',$NUM18
20071     CONC $CHR31 'DISP $CHR38',$CHR40
20072     EXEC $CHR31
20073   ENDIF
20074 ENDIF
20075 LABEL LEVEL3
20076 IF $NUM8 GE 3
20077   FO $CHR19,3,C
20078   CONC $CHR38 'S3',$CHR28
20079   CONC $CHR31 'DISP $CHR19,',$CHR38,$CHR40
20080   EXEC $CHR31
20081   IF $NUM8 EQ 3
20082     CONC $CHR38 '.',$NUM18
20083     CONC $CHR31 'DISP $CHR38',$CHR40
20084     EXEC $CHR31
20085   ENDIF
20086 ENDIF
20087 LABEL LEVEL4
20088 IF $NUM8 GE 4
20089   FO $CHR19,5,C
20090   CONC $CHR38 'S4',$CHR28
20091   CONC $CHR31 'DISP $CHR19,',$CHR38,$CHR40
20092   EXEC $CHR31
20093   IF $NUM8 EQ 4
20094     CONC $CHR38 '.',$NUM18
20095     CONC $CHR31 'DISP $CHR38',$CHR40
20096     EXEC $CHR31
20097   ENDIF
20098 ENDIF
20099 LABEL LEVEL5
20100 IF $NUM8 GE 5
20101   FO $CHR19,7,C
```

```
20102    CONC $CHR38 '$5',$CHR28
20103    CONC $CHR31 'DISP $CHR19,',$CHR38,$CHR40
20104    EXEC $CHR31
20105    IF $NUM8 EQ 5
20106      CONC $CHR38 '.',$NUM18
20107      CONC $CHR31 'DISP $CHR38',$CHR40
20108      EXEC $CHR31
20109    ENDIF
20110  ENDIF
20111  LABEL LEVEL6
20112  IF $NUM8 GE 6
20113    FO $CHR19,9,C
20114    CONC $CHR38 '$6',$CHR28
20115    CONC $CHR31 'DISP $CHR19,',$CHR38,$CHR40
20116    EXEC $CHR31
20117    IF $NUM8 EQ 6
20118      CONC $CHR38 '.',$NUM18
20119      CONC $CHR31 'DISP $CHR38',$CHR40
20120      EXEC $CHR31
20121    ENDIF
20122  ENDIF
20123  LABEL LEVEL7
20124  IF $NUM8 GE 7
20125    FO $CHR19,9,C
20126    CONC $CHR38 '$7',$CHR28
20127    CONC $CHR31 'DISP $CHR19,',$CHR38,$CHR40
20128    EXEC $CHR31
20129    IF $NUM8 EQ 7
20130      CONC $CHR38 '.',$NUM18
20131      CONC $CHR31 'DISP $CHR38',$CHR40
20132      EXEC $CHR31
20133    ENDIF
20134  ENDIF
20135  LABEL LEVEL8
20136  IF $NUM10 GT 0
20137    CONC $CHR31 'DISP $CHR19,$',$NUM10,'SU-NM,$',$NUM10,'SK6 ',$CHR40
20138    EXEC $CHR31
20139  ENDIF
20140  CALC $NUM9 = 1
20141  DO UNTIL $NUM9 GT $NUM8
20142    CON $CHR31 'MOVE $CHR2',$NUM9,' TO $CHR30'
20143    EXEC $CHR31
20144    CON $CHR31 'CONC $CHR38 $CHR2',$NUM9
20145    EXEC $CHR31
20146    IF $CHR30 EQ 'T'
20147      CONC $CHR31 'CALC $NUM1',$NUM9,' = ',$CHR38
20148      EXEC $CHR31
20149    ELSE
20150      CONC $CHR31 'CALC $NUM1',$NUM9,' = $9',$CHR38
20151      EXEC $CHR31
20152    ENDIF
20153    CALC $NUM9 = $NUM9 + 1
20154  DOEND
20155  IF $CHR40 EQ ' PRINT'
20156    DISP AT 20,2 'Writing key attributes to keyfile, RECORD = ',$RECNO
20157  ENDIF
30000  PROGRAM SECTION THREE
30001  IF $CHR40 EQ ' PRINT'
30002    OUTPUT END
30003    DISP AT 15,2 '................................................'
30004    DISP AT 16,2 '................................................'
30005    DISP AT 17,2 '................................................'
30006    DISP AT 18,2 '................................................'
30007    DISP AT 19,2 '................................................'
30008    DISP AT 20,2 '....PROGRAM READY - KEYFILE WRITTEN TO LEG.KEY.....'
30009  ENDIF
30010  CALC $NM = 0
30011  END
```

PROGRAM NAME: TP234-SLT.PRG

```
 10000  PROGRAM SECTION ONE
 10001 REMARK - <TP234-SLT.PRG> PROGRAM TO FILL TP234.SLT
 10002 SEL TU.DBF
 10003 REL TP234.SLT 1 BY TU-ID INIT
 10004 REL TP22.DBF 2 BY TP2
 10005 CALC $1TU-ID = TU-ID
 20000 PROGRAM SECTION TWO
 20001 IF $2GP1 EQ 1
 20002  IF TP4 EQ 12
 20003     CALC $1SYMBOL = 1
 20004   ELSE
 20005     CALC $1SYMBOL = 2
 20006  ENDIF
 20007 ELSE
 20008   IF $2GP1 EQ 3
 20009     IF TP3 EQ 5
 20010       CALC $1SYMBOL = 3
 20011     ELSE
 20012       IF TP3 EQ 6
 20013         IF TP4 EQ 2
 20014           CALC $1SYMBOL = 4
 20015         ELSE
 20016           IF TP4 EQ 3
 20017             CALC $1SYMBOL = 5
 20018           ELSE
 20019             CALC $1SYMBOL = 6
 20020           ENDIF
 20021         ENDIF
 20022       ELSE
 20023         IF TP4 EQ 2
 20024           CALC $1SYMBOL = 7
 20025         ELSE
 20026           IF TP4 EQ 7
 20027             CALC $1SYMBOL = 8
 20028           ELSE
 20029             IF TP4 EQ 8
 20030               CALC $1SYMBOL = 9
 20031             ELSE
 20032               CALC $1SYMBOL = 10
 20033             ENDIF
 20034           ENDIF
 20035         ENDIF
 20036       ENDIF
 20037     ENDIF
 20038   ELSE
 20039     IF $2GP1 EQ 4
 20040       IF TP4 EQ 1
 20041         CALC $1SYMBOL = 11
 20042       ELSE
 20043         CALC $1SYMBOL = 12
 20044       ENDIF
 20045     ELSE
 20046       IF $2GP1 EQ 5
 20047         IF TP3 EQ 1
 20048           CALC $1SYMBOL = 13
 20049         ELSE
 20050           CALC $1SYMBOL = 14
 20051         ENDIF
 20052       ELSE
 20053         IF $2GP1 EQ 6
 20054           IF TP3 EQ 2
 20055             CALC $1SYMBOL = 15
 20056           ELSE
 20057             CALC $1SYMBOL = 16
 20058           ENDIF
 20059         ELSE
 20060           IF $2GP1 EQ 7
 20061             CALC $1SYMBOL = 17
 20062           ELSE
 20063             CALC $1SYMBOL = 999
 20064           ENDIF
 20065         ENDIF
 20066       ENDIF
 20067     ENDIF
 20068   ENDIF
 20069 ENDIF
 30000 PROGRAM SECTION THREE
 30001 CALC $1LABEL = $1SYMBOL
 30002 END
```