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1. Appendices

Appendix 1. List of Computer Files in the \LUSE Directory

All files that should be on the hard disk of your computer after a complete installation of The Land Use Database are listed below (the compressed files from which they were extracted are underlined). The .DBF files are database file in dBase-III+ format containing numbers and codes. The .DBT files are database files containing texts (memo's) of the free text windows.

In the LUSE directory:

ARJ.EXE :	ARJ.EXE		
PROG.ARJ :	LUSE.BAT	LUSE2.BAT	MAIN.EXE
	LBHELP.DBF	LBHELP.HLP	BWSTD.COL
	CO1STD.COL	CO2STD.COL	LCD.COL
CONFIG.ARJ :	CONFIG.EXE		
LUTBASE.ARJ :	LUTBASE.EXE		
LBCFG.ARJ :	LB.CFG		

In the LUSE\DATA directory:

DATA.ARJ :	CAQUAN.DBF	IMPLEM.DBF	INFRA.DBF
	INPUT.DBF	PARCEL.DBF	QUESTION.DBF
	LABINPUT.DBF	LUSEATTR.DBF	LUSECA.DBF
	LUSENAME.DBF	OPEROBS.DBF	PRODUCE.DBF
	QUERY.DBF	SEQUENCE.DBF	OPEROBS.DBT
	PARCEL.DBT	QUERY.DBT	QUESTION.DBT
	SEQUENCE.DBT	CHECK.1	CHECK.2

In the LUSE\GLOSSARY directory:

GLOSSARY.ARJ :	DATASET.DBF	GLOSSARY.DBF	GLOSHELP.DBF

Note

After installation, in the various directories, also *.CDX files may be present. They represent 'index' files containing index keys that establish the links between records in different database files. When certain *.CDX files are absent, the software will automatically create new ones during start-up procedures. Then for each *.DBF file one *.CDX file must exist.

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Appendix 2. Codes in Colour Settings File

The Land Use Database uses a *.COL file containing preferences about "screen-mode" and "colours". A number of files is supplied in the C:\LUSE directory (see Section 6.2.1), containing settings for a monochrome, colour and LCD monitors. These files are provided with default settings, but you may edit them or create new ones. You can use any ASCII-based text editor to modify them, according to the following rules:

1. If the first character on a line is an asterisk (*), or the line is empty, then the line is skipped by the program.

2. All other lines must consist of a setting, the equal-sign (=), and a constant. The lines may be in upper case, lower case, or mixed case. Between the setting, the equal-sign and the constant, spaces and/or tab characters may be inserted.

3. Defining colours. The following settings are available:

   cBox=normal,enhanced
   The colour of the edit screens. Normal applies to the frames, enhanced applies to the titles.

   cSays=normal,enhanced
   The colour of regular text. Normal applies to plain text, enhanced applies to some specific text.

   cFields=normal,enhanced
   The colour of the fields of edit screens. Normal applies to the non-current fields, enhanced to the current field.

   cMenus=normal,enhanced
   The colour of the picklists. Normal applies to the non-highlighted items, enhanced to the highlighted item.

   cMessage=normal
   The colour of the messages displayed in the information bar.

   cError=normal
   The colour of the message <Press Return> when an error occurred.

   cIntro=normal, enhanced
   The colour of the screens displayed before any Main Menu of a module.

   Both normal and enhanced consist of a foreground and a background colour, separated by a slash (/). If you use "enhanced", you must type the comma (,), even if you want to omit "normal". The available colours are listed in the below table:

Colour monitor	Code	Monochrome monitor
Black	N, Space	Black
Blue	B	Underline
Green	G	White
Cyan	BG	White
Red	R	White
Magenta	RB	White
Brown	GR	White
White	W	White
Gray	N+	Black
Bright Blue	B+	Bright Underline
Bright Green	G+	Bright White
Bright Cyan	BG+	Bright White
Bright Red	R+	Bright White
Bright Magenta	RB+	Bright White
Yellow	GR+	Bright White
Bright White	W+	Bright White
Black	U	Underline
Inverse Video	I	Inverse Video
Blank	X	Blank

Note 1: In addition, every foreground colour may be followed by an asterisk (*), to denote that the text should be blinking.

Note 2: It is not recommended to use the colour Inverse Video (I), because inverse video is based on the last used colour, which could have been from a different setting.

Any invalid line in the file is skipped. If an error occurres, a message will be displayed for that line (at program start). If the appropriate file is not found, the program will use some default colours.

Below follows an example of the provided file for monochrome screens, B&W.COL:

```
* BWSTD.COL    (for Monochrome screens)
cBox      =    W/M,N/W
cSays     =    W/N,W+/N
cFields   =    N/W,W+/B
cMenus    =    W/N,W+/N
cMessage  =    N/W
cError    =    N*/W
cIntro    =    W/N,W/N
```

Appendix 3. List of All Fields and Their Attributes

Below, all fields of **Land Use Data** and **Land Use Classes** are listed per data entry screen (i.e. file), in the order in which they appear in the screens. The field names, links to glossary trees and options to select the field and pre-select glossary items in the data entry filter are printed (Filter). The Identifier fields marked with a ▪ can only be used for the definition of rules and output fields in the Query Module.

Type of Field

- ≫g = linked to a glossary tree
- » a = lihked to an a-priori LU class
- » f = linked to a fixed picklist
- - n = number field
- - d = date field
- - 1 ▫ latitude/longitude field
- - c = code field
- - f ▫ free text field

Filter Options

- Fix = field is always included
- Y/N = field can be selected
- » = glossary items can be pre-selected
- PE ▫ the previous entry can be printed

File Name & Field Name	Type of Field	Link to Glossary Tree	Filter
Dataset Identifications (Section 6.4.2)			
. A Unique Dataset ID	- n		
Administrative Area	≫g	Administrative Areas	Fix »
Project	≫g	Projects	Fix »
Dataset Number	- n		Fix
Dataset Type	» f		Fix
Enumeration Date	- d		Y/N
Enumerator's Name	- f		Y/N PE
Respondent's Name	- f		Y/N PE
Holder's Name	- f		Y/N PE
Holding Location - Latitude (S or y)	- 1		YIN
Holding Location - Longitude (*, or x)	- 1		Y/N
Holding Location - Ellipsoid/Spheroid			YIN
Holding Location - UTM Zone	- n		YIN
Holding Location - UTM Northing	- n		Y/N
Holding Location - UTH Easting	- n		YIN
Holding Size	- n		YIN
- Unit	≫g	Data Units	Fix »
- Info Source	≫g	Inf 0 Sources	Y/N »
Comments	- f		Y/N

. . . Continued

File Name & Field Name	Type of Field	Link to Glossary Tree	Filter
Site Identifications (Section 6.5.2)			
A Unique Site-ID	- n		
Plot Aggregation	» f		Fix
Mapping Unit-ID	- c		Y/N PE
- Comp. /Element-ID			Y/N
- Hap Comnents	1;		Y/N
Site Name	- f		YIN
Cadastral Number	- n		Y/N
Tenancy Arrangement	» g	Tenancy arrangement	Y/N »
Parcel Size	- n		YIN
- Unit	» g	Data Units	Fix »
- Info Source	g	Info Sources	Y/N »
Distance to Holding	- n		YIN
- Unit	» g	Data Units	Fix »
- Info Source	» g	Inf 0 Sources	Y/N »
Comments	- f		YIN
Land Use Svstem Descriptions (Section 6.6.2)			
. A Unique LUS Description ID	- n		
Plot Location - Latitude ($ or y)	- 1		Y/N
Plot Location - Longitude (* or x)	- 1		Y/N
Plot Location - Ellipsoid/Spheroid			Y/N
Plot Location - UTM Zone	- n		Y/N
Plot Location - Northing	- n		Y/N
Plot Location - Easting	- n		Y/N
Plot Size	- n		Y/N
- Unit	» g	Data Units	Fix »
- Info Source	» g	Info Sources	Y/N »
- Boundaries	» f		Fix
Infrastructure	*		Fix
Soil Sample-ID	- c		YIN
Oper.Seq. Period	- d		Y/N
A-Priori LU Class	» a	Land Use Classes	Fix »
- Purposes & Quant.	*		Fix
Comments	- f		YIN
Infrastructure (Section 6.6.3)			
. A Unique Infrastructure	- n		
Infrastructure	» g	Infrastructures	Y/N »
Quantity	- n		Y/N
- Unit	» g	Data Units	Fix »
- Info Source	» g	Inf 0 Sources	Y/N »

. Continued

File Name & Field Name	Type of Field	Link to Glossary Tree	Filter
Land Use Purposes and Quantities (Section 6.6.4)			
A Unique LU Purpose ID	- n		
Species/Service	≫g	Species/Services	Fix ≫
Product/Benefit	≫g	Products/Benefits/Materials	Fix »
Quantity	- n		Fix
- Unit	≫g	Data Units	Fix ≫
- Info Source	≫g	Info Sources	Y/N ≫
Operations (Section 6.7.2)			
A Unique Operation ID	- n		
Operation	≫g	Operation Names	Fix ≫
- Species involved	≫g	Species/Services	Fix
% of Plot involved	- n		Y/N
Operation Period	- d		YIN
Periodicity	≫f		Y/N
- Description	- f		YIN
Operation Duration	- n		YIN
- Unit	≫g	Data Units	Fix ≫
- Info Source	≫g	Inf 0 Sources	Y/N »
Task Time	- n		YIN
- Unit	≫g	Data Units	Fix »
- Info Source	≫g	Inf 0 Sources	Y/N »
Labour Inputs	*		Fix
Material Inputs	*		Fix
Implements Used			Y/N
Main Power Source	≫g	Power Sources	Fix ≫
Products/Benefits	*		Fix
Comments	- f		Y/N
Labour Inputs (Section 6.7.3)			
A Unique Labour Input ID	- n		
Gender & Age Class	≫g	Gender & Age Classes	Fix ≫
Skill	≫g	Skills	Y/N ≫
No. of Persons	- n		YIN
- Info Source	≫g	Info Sources	Y/N ≫
Task Time	- n		YIN
- Unit	≫g	Data Units	Fix »
- Info Source	≫g	Inf 0 Sources	Y/N »
Labour Origin	≫g	Labour Origins	Y/N »

. Continued

File Name & Field Name	Type of Field	Link to Glossary Tree	Filter
Material Inputs (Section 6.7.4)			
♀ A Unique Material Input ID	- n		
Material Input	≫g	Material Inputs	Fix »
Quality Class	≫g	Quality Classes	Y/N »
Quantity	- n		YIN
- Unit	≫g	Data Units	Fix »
- Info Source	≫g	Inf 0 Sources	Y/N »
Input Origin	≫g	Material Input Origins	Y/N »
Implements Used (Section 6.7.5)			
. A Unique Implement ID	- n		
Implement	≫g	Implements	Y/N »
- Implement Species	≫g	Species/Services	Fix
Quality Class	≫g	Quality Class	Y/N »
Number used	- n		Y/N
- Info Source	≫g	Info Sources	Y/N »
Implement Origin	≫g	Implement Origins	Y/N »
Obtained Products/Benef its (Section 6.7.6)			
. A Unique Product/Benefit ID	- n		
Species/Service	≫g	Species/Services	Fix
Product/Benefit	≫g	Products/Benefits/Materials	Fix
Quality Class	≫g	Quality Classes	Y/N »
Quantity	- n		Y/N
- Unit	≫g	Data Units	Fix »
- Info Source	≫g	Inf 0 Sources	Y/N »
Product Destination	≫g	Product Destinations	Y/N ≫
- A-Priori LU Class	» a	A-Priori Land Use Classes	Fix
Observations			
. A Unique Observation ID	- n		
Observation Name	≫g	Observation Names	Fix »
- Species involved	≫g	Species/Services	Fix
Sample-ID			YIN
Observation Period	1;		YIN
Relocated Material	» g	Products/Benefits/Materials	Y/N ??
- Origin/Destination	≫g	Material Relocations	Y/N
Observed Quantity	- n		Y/N
- Unit	≫g	Data Units	Fix »
- Info Source	≫g	Info Sources	Y/N »
Implements Used	≫g		Y/N
Production Increase	- n		Y/N
- Info Source	≫g	Inf 0 Sources	Y/N »
Comments	– f		Y/N

. . . . Continued

File Name & Field Name	Type of Field	Link to Glossary Tree	Filter
A-Priori Land Use Classif ication Systems / A-Priori Land Use Classes (Sections 6.8.2 / 6.8.4)			
. A Unique A-Priori LU Class ID	- n		
Code			Fix
Name / A-Priori Land Use Class	1;		Fix
Land Use Purpose Classifiers (Section 6.8.4)			
. A Unique LU Purpose Classifier ID	- n		
Species/Service	≫ g	Species/Services	Fix
Product/Benefit	≫ g	Products/Benefits/Materials	Fix
Other Classifiers (Section 6.8.4)			
e A Unique Classifier ID	- n		
Operation Sequence Classifiers	“ 4	Classifiers: Oper .Sequence	Y/N »
Context Classifiers	≫ g	Classifiers: Context	Y/N »

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Appendix 4. Coordinates

Two types of coordinate systems can be used to specify a location in The Land Use Database: geographical coordinates and UTM projections. The program can transform geographical coordinates to UTM projections and vice versa.

Geographical coordinates

Geographical coordinates specify a location on the ball-shaped earth by degrees. The **latitude** is the number of degrees north of the equator for locations in the Northern hemisphere, or south of the equator for locations in the Southern hemisphere. The **longitude** is the number of degrees east of the prime meridian (Greenwich, UK) for the Eastern hemisphere, or west from Greenwich for the Western hemisphere.

In The Land Use Database, geographical coordinates can be entered in **decimals** or in **degrees, minutes and seconds** (in the hexadecimal system: '"). This is selected in the Settings screen, see Section 6.2.1.

UTM (Universal Transverse Mercator Grid System) Projections

The UTM (cylindrical) projection transforms small parts of the earth's surface (**UTM zones**) into flat rectangles in order to facilitate topographic mapping, since it shows equal distances. Within the UTM zone, the location is specified by its **Northing** and **Easting**, expressed in meters. Latitudes from 80 S to 84 N are covered by the system.

Ellipsoid and **spheroid** specifications are used to carry out the transformations required for UTM projections. These depend on the local shape of the earth, and are therefore often location-specific. A number of ellipsoids and spheroids developed for different parts of the world can be used in The Land Use Database. Ellipsoids and spheroids must be selected in the settings screen (Section 6.2.2). Since ellipsoids and spheroids differ widely, it is very important to select the right one when entering UTM coordinates in The Land Use Database, i.e. the one used for the coordination system of the information source (map, satellite image, report, etc.) from where the coordinates were obtained.

Note
Since The Land Use Database stores all coordinates as geographic coordinates, UTM projections will be converted before storage. Due to the complexity of these conversions, the UTM projections may be slightly different after storage.

Appendix 5. Maximum and Minimum Data Entry Filter

Three standard data entry filters are provided with The Land Use Database. In the Maximum Filter, all possible fields are selected and for a number of fields glossary items are pre-selected, especially for data unit fields. In the Minimum Filter, no fields are selected, so data entry screens will only contain the fields that are always included ('Fix' fields); for some fields, glossary items are pre-selected, especially for the fields with data units. The Minimum Filter t Periods, the Minimum Dataset is extended with fields containing temporal aspects of the land use data, e.g. operation sequence period, task time.

Below, the Maximum and Minimum Filters are printed showing the selected parameters and pre-selected parameter values.

Maximum Filter

Fix = Compulsory Field
Yes = Selected Field
‹ › ▫ **Comments**
» **= Not** Specified
>>- = Not Further Specified

```
:A-PRIORI LAND USE CLASSES

Oper.Seq.Classifiers   Yes »
Context Classif.       Yes »

Land USE DATA

1. DATASET IDENTIFICATIONS
Administrative Area    Fix »
Project                Fix »
Enumeration Date       Yes
Enumerator's Name      Yes Display Previous Entry: Yes
Respondent's Name      Yes Display Previous Entry: Yes
Holder's Name          Yes Display Previous Entry: Yes
Holding Lat-Long       Yes
Holding UTM Coord.     Yes
Holding Size           Yes
- Unit                 Yes Areas (Square Heasures), >>-
- Info Source          Yes »
Comments               Yes

2. SITE IDENTIFICATIONS
Mapping Unit-ID        Yes Display Previous Entry: Yes
- Comp./Element-ID     Yes
```

- Map Comments	Yes
Site Name	Yes
Cadastral Number	Yes
Tenancy Arrangement	Yes »
Parcel Size	Yes
- Unit	Yes Areas (Square Measures), »-
- Info Source	Yes »
Distance to Holding	Yes
- Unit	Yes Time (Duration), »- Lengths (Linear Measures), »-
- Info Source	Yes »
Comments	Yes

3. LAND USE SYSTEM DESCRIPTIONS

Plot Lat-Long	Yes
Plot UTM Coord.	Yes
Plot Size	Yes
- Unit	Yes Areas (Square Measures), »
- Info Source	Yes »
Infrastructure	Yes »
Quantity	Yes
- Unit	Yes No Dimension (Just Numbers), »- Lengths (Linear Measures), »- Areas (Square Measures), »- Volumes (Cubic Measures), »- Percentages (%), »-
- Info Source	Yes »
Soil Sample-ID	Yes
Oper.Seq. Period	Yes
A-Priori LU Class	Fix »
Species/Service	Fix ‹ A-Priori Land Use Class acts as Filter ›
Quantity	Fix
- Unit	Fix No Dimension (Just Numbers), »- Percentages (%), »- Areas (Square Measures), »-
- Info Source	Yes »
Product/Benefit	Fix ‹ A-Priori Land Use Class acts as Filter ›
Quantity	Fix
- Unit	Fix No Dimension (Just Numbers), »- Volumes (Cubic Measures), »- Masses (Weights), »- Rates;Yield (Weight/Area), »- Rates;Yield (Volume/Area), »- Rates;Flow (Volume/Time), »-
- Info Source	Yes »
Comments	Yes

4.OPERATIONS

Operation Name	Fix »
% of Plot involved	Yes
Operation Period	Yes
Periodicity	Yes
- Description	Yes
Operation Duration	Yes
- Unit	Yes Time (Duration), Hour, » - Time (Duration), Day, » - Time (Duration), Week, » - Time (Duration), Month, »-
- Info Source	Yes »
Task Time	Yes
Unit	Yes Percentages (%), » - Time (Duration), Manday, »-
Info Source	Yes »

Labour Inputs

Gender » Age Class	Fix »
Skill	Yes »
No. of Persons	Yes
- Info Source	Yes »
Task Time	Yes
- Unit	Yes Percentages (%), » - Time (Duration), Manday, » -
- Info Source	Yes »
Labour Origin	Yes »

Haterial Input	Fix »
Quality Class	Yes »
Quantity	Fix
- Unit	Fix No Dimension (Just Numbers), » - Lengths (Linear Measures), »- Volumes (Cubic Measures), » - Masses (Weights), » - Rates;Yield (Weight/Area), » - Rates;Yield (Volume/Area), » -
- Info Source	Yes »
Input Origin	Yes »

Implement	Yes »
Quality Class	Yes »
Number used	Yes
- Info Source	Yes »
Implement Origin	Yes »

Main Power Source	Fix »

Products/Benef its	Fix ◊ A-Priori Land Use Class acts as Filter ›
Quality Class	Yes »
Quantity	Fix
- Unit	Fix ‹ Linked to Land Use System Description ›
- Info Source	Yes »

Product Destination	Yes	>>
- A-Priori LU Class		‹ See Filter Setting under Land Use Data ›
Comments	Yes	

4. OBSERVATIONS

Observation Name	Fix	»
Sample-ID	Yes	
Observation Period	Yes	
Relocated Material	Yes	Plant Produce, » - Animal Produce, >> - Soil, >> - Water, » - Minerals/Nutrients, >> -
- Origin/Destination	Yes	»
Observed Quantity	Yes	
- Unit	Yes	No Dimension (Just Numbers), » - Percentages (%), » - Volumes (Cubic Measures), » - Masses (Weights), » - Rates;Yield (Weight/Area), » - Rates;Yield (Volume/Area), » - Rates; Flow (Volume/Time), » -
- Info Source	Yes	»
Implements Used	Yes	‹ See Under Operations ›
Production Increase	Yes	
- Info Source	Yes	>>
Comments	Yes	

Minimum Filter

Fix = Compulsory Field
Yes = Selected Field
< > = Comments
>> = Unspecified
>>- = Further Unspecified

A-PRIORI LAND USE CLASSES

Oper.Seq.Classifiers	Yes	>>
Context Classif.	Yes	»

LAND USE DATA

1.DATASET IDENTIFICATIONS

Administrative Area Fix »
Project Fix »

2.SITE IDENTIFICATIONS

3.LAND USE SYSTEM DESCRIPTIONS
A-Priori LU Class Fix »

Species/Service	Fix ‹ A-Priori Land Use Class acts as Filter ›
Quantity	Fix
- Unit	Fix No Dimension (Just Numbers), »-
	Percentages (%), »-
	Areas (Square Measures), »-

Product/Benefit	Fix ‹ A-Priori Land Use Class acts as Filter ›
Quantity	Fix
- Unit	Fix No Dimension (Just Numbers), »-
	Volumes (Cubic Measures), »-
	Masses (Weights), »-
	Rates;Yield (Weight/Area), »-
	Rates;Yield (Volume/Area), »-
	Rates;Flow (Volume/Time), »-

4 .OPERATIONS
Operation Name Fix »

-Labour Inputs
Gender & Age Class Fix »

Material Input	Fix »
Quantity	Fix
- Unit	Fix No Dimension (Just Numbers), »-
	Lengths (Linear Measures), »-
	Volumes (Cubic Measures), »-
	Masses (Weights), »-
	Rates; Yield (Weight/Area), »-
	Rates;Yield (Volume/Area), »-

Main Power Source Fix »

Products/Benefits	Fix ‹ A-Priori Land Use Class acts as Filter >
Quantity	Fix
- Unit	Fix ‹ Linked to Land Use System Description ›

4. OBSERVATIONS
Observation Name Fix »

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Appendix 6. Structure of Query Output

If you wish to retrieve large amounts of information from different files of The Land Use Database to a flat query output file, the information of different files is structured in the following way:

DI	SI	LUS	Infr	Obs	Impl	Ope	Impl	Mat	P/B	Lab
1	1	1				1	1			
1	1	1				1	2			
1	1	1				1		1		
1	1	1				1		2		
1	1	1				1			1	
1	1	1				1			2	
1	1	1				1				1
1	1	1				1				2
1	1	1				2	...			
1	1	1		1	1					
1	1	1		1	2					
1	1	1		2	...					
1	1	1	1							
1	1	1	2							
1	1	2	...							
1	2	3	...							
2	3	4	...							

DI = Dataset Identifications
SI = Site Identifications
LUSD = Land Use System Descriptions
Infr = Infrastructure
LUP = Land Use Purposes
Obs = Observations
Impl = Implements Used
Oper = Operations
Impl = Implements Used
P/B = Products/Benefits Obtained
Mat = Material Inputs

Numbers refer to information from a record
Dots (...) refer to a similar structure as above

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Appendix 7. Specifying Qualitative Periods

Often periods of time, e.g. of an operation sequence, cannot be given accurately by the respondent. In these cases, the following rules may be used to transform 'qualitative' periods into start and end dates that can be entered in the applicable fields of edit screens.

Qualitative period	Start date	End date
Dates on a weekly basis		
First week of May 1991	01/05/91	07/05/91
Second week of May 1991	08/05/91	14/05/91
Third week of May 1991	15/05/91	21/05/91
Fourth week of May 1991	22/05/91	31/05/91
Dates by 10-day periods		
Beginning of May 1991	01/05/91	10/05/91
Mid of May 1991	11/05/91	20/05/91
End of May 1991	21/05/91	31/05/91
Dates by 15-day periods		
First half of May 1991	01/05/91	15/05/91
Second half of May 1991	16/05/91	31/05/91
Dates on a monthly basis		
During May 1991	01/05/91	31/05/91
Dates on a 3-monthly basis		
First quarter of 1991	01/01/91	31/03/91
Second quarter of 1991	01/04/91	30/06/91
Third quarter of 1991	01/07/91	30/09/91
Fourth quarter of 1991	01/10/91	31/12/91
Dates on a 4-monthly basis		
Beginning of 1991	01/01/91	30/04/91
Mid of 1991	01/05/91	31/08/91
End of 1991	01/09/91	31/12/91
Dates on a 6-monthly basis		
First half of 1991	01/01/91	30/06/91
Second half of 1991	01/07/91	31/12/91
Dates on a yearly basis		
During 1991	01/01/91	31/12/91

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Appendix 8. Operator and Function Codes to Build Formulas

Formulas (expressions) are used to combine or calculate values. They can include built-in functions. Expressions can be constructed by any of the following operators:

Operator	Description	Data Type
( )	grouping	all
+	concatenate	characters, memos
-	concatenate, but put interven. spaces behind string	characters, memos
-	subtract	date
+	addition / unary positive	numbers
-	subtraction / unary negative	numbers
*	multiplication	numbers
/	division (with remainder)	numbers
%	modulus (remainder of division)	numbers
**, ^	power	numbers
<	less than	relative
<=	less than or equal	relative
>	greater than	relative
>=	greater than or equal	relative
=	equal	relative
==	exactly equal (characters only)	relative
<>, #, !=	not equal	relative
$	contained in (characters only)	relative
.AND.	all must be true	logical
.OR.	one of all must be true	logical
.NOT., !	unary negate	logical
.T.	true (not operator, but value)	logical
.F.	false (not operator, but value)	logical

A number of pre-defined functions are built-in. Just an extract of functions is given below. Additional functions can be found in any Clipper manual Nantucket.

Note: ***c*** are character strings/memos, ***n*** are numbers, ***d*** are dates, and ***l*** are logics.

Functions returning a number

ASC(c)	Returns the ASCII-value of the first character in c. Opposite of CHR.
AT(c1, c2)	Returns the position of c1 in c2, or 0 if c2 does not contain c1.
EXP(n)	Returns the exponent of n, which is approximately 2.7181 raised to the power n. The maximum value of n is 45. Opposite of LOG.
INT(n)	Returns the integer part of n. All the decimals are truncated, not rounded. See also ROUND.
LEN(c)	Returns the number of characters contained in c.
LOG(n)	Returns the natural logarithm of n. n Must be greater than 0. Opposite of EXP.
MAX(n1, n2)	Returns the maximum value of n1 and n2.
MIN(n1, n2)	Returns the minimum value of n1 and n2.
ROUND(n1, n2)	Returns n1, rounded to n2 decimals.

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Functions returning a character string

ALLTRIM(c)	Returns c, in which all leading and trailing blanks are stripped.
CHR(n)	Returns the character which has the ASCII-value n. Opposite of ASC.
DTOC(d)	Returns a character string containing the date d. It will be in the format of the date setting. Opposite of CTOD.
FIRSTCAP(c)	Returns c, in which all words start with an upper-case letter and the rest of the word in lower-case. See also LOWER and UPPER.
LEFT(c, n)	Returns the first n characters of c.
LOWER(c)	Returns c, in which all characters are converted to lower-case. See also FIRSTCAP and UPPER.
LTRIM(c)	Returns c, in which all leading blanks are stripped. See also ALLTRIM, TRIM and RTRIM.
REPLICATE(c, n)	Returns a character string which contains n repetitions of c.
RIGHT(c, n)	Returns the last n characters of c.
SUBSTR(c, n1, n2)	Returns n2 characters from c, starting at the character at position n1. If n2 is omitted, returns all the characters from c starting at position n1.
UPPER(c)	Returns c, in which all characters are converted to upper-case. See also FIRSTCAP and LOWER.

Functions returning a logic value

.F.	Returns false.
.T.	Returns true.

Functions returning a date

CTOD(c)	Returns the date, contained in c. c Must represent the date according to the date setting. Opposite of DTOC.
DATE()	Returns the system date.
MAX(d1, d2)	Returns the latest date of d1 and d2.
MIN(d1, d2)	Returns the first date of d1 and d2.

Miscellaneous functions

IF(l, x, y)	Evaluates the logic condition l. If that is true, evaluates and returns expression *x*, else expression *y*. x And y may be of different type. Examples: IF(.T., 3, 5) returns 3. IF(3>5, 3*5, 3*4) returns 12.

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Appendix 9. Print of an Example Dataset

A print-out of a complete dataset, as collected in Botswana during the fieldtest of The Land Use Database and stored in the program, is shown below:

DATASET IDENTIFICATIONS
Date: 18/12/1995 Time: 16:41:00

==1. Dataset Identification==========

Administrative Area	:	Africa, Botswana, Central, Palapye, Ratholo, Mokgalwana
Project	:	FAO, BOT/91/001
Dataset Number	:	21
Dataset Type	:	Actual
Enumeration Date	:	12/11/1993 (dd/mm/yyyy)
Enumerator's Name	:	Moahi T S
Respondent's Name	:	Moshoeshoe Moshoeshe

==2. Site Identifications==========

Plot Aggregation	:	Each LUS Description is valid for one Plot

==3. Land Use System Descriptions ==========

Plot Location - Geographic Coordinates

- Latitude (or y) : South	:	22°44'41" [Degrees] (22.74472)
- Longitude (or x): East	:	27°32'17" [Degrees] (27.53806)

Plot Location - UTM Projection

- Ellipsoid/Spheroid	:	Clarke 1880
- UTM Zone	:	35
- Northing	:	7484850 [Meters]
- Easting	:	555246 [Meters]
Plot Size	:	1.00 - 1.00 [Min - Max]
- Unit	:	Hectare (ha) (10000.0000000000)
- Info Source	:	Collected in the Plot, through Interview, of Farmer
- Boundaries	:	Based on actual Plot Boundaries

==Infrastructures==========

Infrastructure	:	Plot Structures / Works, Fences, made of Combined Materials
Infrastructure	:	Roads and Paths, >> -

Oper.Seq. Period	:	24/01/1993 - **/11/1993 (dd/mm/yyyy)
A-Priori LU Class	:	FAO-Test, Mixed-Intercr.of Cereal + Pukin/Melons/Pulse/Sw.Reed
- Species/Service	:	Plants, Cereals, Sorghum/Broom~/Durra~/Jowar; Sorghum bicolor (L.) Moench, cv. Segaolane
Product/Benefit	:	Plant Produce, Flowers/Fruits/Seeds, Grain (Cereals), Not Milled/Cleaned
- Quantity	:	0.00 - 0.00 [Min - Max]
- Unit	:	Kilogram (kg) (1.0000000000)
- Info Source	:	Collected in the Plot, through Interview, of Farmer

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- **Species/Service** : Plants, Edible fruits and nuts, Other Families, Watermelons; Citrullus lanatus (Thunberg) Matsum. & Nakai, Watermelons; ssp. vulgaris (Schrader) Fursa
Product/Benefit : Plant Produce, Flowers/Fruits/Seeds, Fruits
- Quantity : 0.00 - 0.00 [Min - Max]
- Unit : Pieces (1.0000000000)
- Info Source : Collected in the Plot, through Interview, of Farmer

==4. Operations & Observations==========
Operation Name : Tillage, Ploughing, Along Contours (or Flat), >> -
Operation Period : 24/01/1993 - 31/01/1993 (dd/mm/yyyy)
Operation Duration : 1.00 - 1.00 [Min - Max]
- Unit : Day (1.0000000000)
- Info Source : Collected in the Plot, through Interview, of Farmer
Task Time : 2.00 - 2.00 [Min - Max]
- Unit : Manday (0.3333333330)
- Info Source : Collected in the Plot, through Interview, of Farmer

==Labour Inputs==========
Gender & Age Class : Adult 16-59 years, Male, >> -
Labour Origin : Contract Labourer
==Implements Used==========
Implement : Mechanically Powered, Tractors, Four wheel tractor, Rear-Wheel Drive, >> -
Number used : 1.00 - 1.00 [Min - Max]
- Info Source : Collected in the Plot, through Interview, of Farmer
Implement Origin : Rented, >> -

Implement : Powered by other Equipment, for Tillage, Primary Tillage Implements, Ploughs, >> -
Number used : 1.00 - 1.00 [Min - Max]
- Info Source : Collected in the Plot, through Interview, of Farmer
Implement Origin : Rented, >> -

Main Power Source : Human Power

Operation Name : Fallow Grazing
Operation Period : **/04/1993 - **/11/1993 (dd/mm/yyyy)
Operation Duration : 6.00 - 7.00 [Min - Max]
- Unit : Month (30.5000000000)
- Info Source : Collected in the Plot, through Interview, of Farmer

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Observation Name : Growth Reducing Factors, Infectious Plant Related, Livestock

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Observation Name : Crop Conditions, Wilting

***** END OF DATASET IDENTIFICATIONS *****

Appendix 10. Print of an Example A-Priori Land Use Classif ication System

A print-out of part of the a-priori land use classification system as developed for fieldtest of The Land Use Database in Southern Africa and stored in the program, is shown below:

A-PRIORI LARD USE CLASSES
Date: 18/12/1995 Time: 16.51.19

=Code: 5: FAO-Test

Code : 1
A-Priori LU Class : Single Cropping of Cereals
-Land Use Purpose Classifiers
- Species/Service : Plants, Cereals, »-
Product/Benefit : Plant Produce, Vegetative parts, »-
- Species/Service : Plants, Cereals, »-
Product/Benef it : Plant Produce, Flowers/Fruits/Seeds, Grain (Cereals), »-
-Operation Sequence Classifiers
- 1 : Crop Production, Yes, Temporary (arable) Cropping, Single Cropping, »-

Code : 2
A-Priori LU Class : Sequential Double Cropping of Cereals-Cereals
-Land Use Purpose Classifiers
- Species/Service : Plants, Cereals, »-
Product/Benef it : Plant Produce, Vegetative parts, »-
- Species /Service : Plants, Cereals, »-
Product/Benefit : Plant Produce, Flowers/Fruits/Seeds, Grain (Cereals), »-
-Operation Sequence Classifiers
- 1 : Crop Production, Yes, Temporary (arable) Cropping, Multiple Cropping, Sequential Cropping (-), Double

Code : 3
A-Priori LU Class : Sequential Double Cropping Cereals-Vegetables
-Land Use Purpose Classifiers
- Species/Service : Plants, Cereals, »-
Product/Benefit : Plant Produce, Vegetative parts, »-
- Species/Service : Plants, Cereals, »-
Product/Benef it : Plant Produce, Flowers/Fruits/Seeds, Grain (Cereals), »-
- Species/Service : Plants, Vegetables, »-
Product/Benef i t : Plant Produce, Vegetative parts, Leaves / Shoots, »-
- Species/Service : Plants, Vegetables, »-
Product/Benef it : Plant Produce, Flowers/Fruits/Seeds, »-
-Operation Sequence Classifiers
- 1 : Crop Production, Yes, Temporary (arable) Cropping, Multiple Cropping, Sequential Cropping (-), Double