C.A. de Bie
J.A. van Leeuwen
P.A. Zuidema

The Land Use
Database

The Data Entry Module

6.   The Data Entry Module

Instructions on the use of the Data Entry Module, i.e. how to enter collected land use data, how to edit stored information, how to define a-priori land use classes, and how to change the program settings.

6.1   How to Start the Data Entry Module

After you selected Data Entry from the main menu of The Land Use Database (*Section 4.1*), the main menu of the Data Entry Module is displayed:
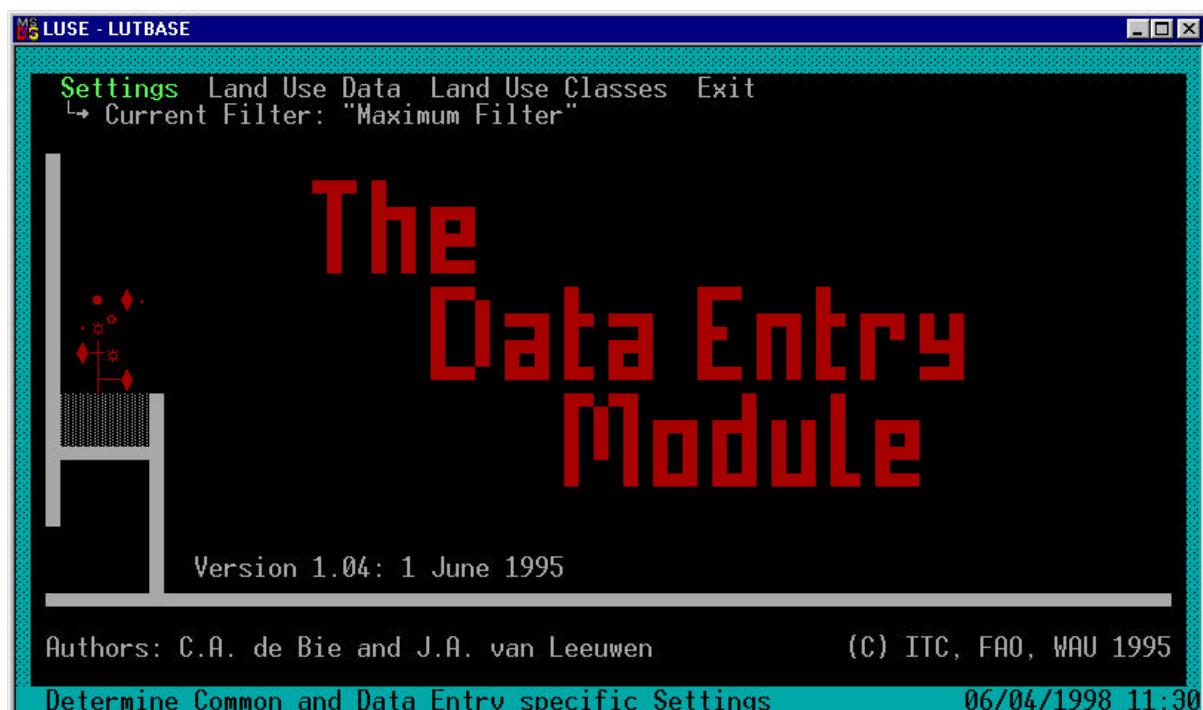
To select one of the 4 options from the main menu of the Data Entry Module hHighlight an option by using the ↑ or ↓ key and press **Enter** to select the option. The options are briefly explained below with reference to the Sections in which they are discussed:

Settings

   With this option you can **define** common program settings of The Land Use Database, and **select** the current data entry configuration (*Section 6.2*).

Land Use Data

   With this option you can enter collected and edit stored land use data (*Section 6.3*).

Land Use Classes

   With this option you can define new or edit stored *a-priori* land use classes (*Section 6.8*).

Exit

   Exit the Data Entry Module; also possible by pressing **Esc**. You will return to the main menu of The Land Use Database (*Section 4.1*).

6.2   Settings

The settings option offers the possibility to select general program settings as well as specific settings for the Data Entry Module. After selecting **Settings** from the main menu of the Data Entry Module, the next screen is displayed:

```
«Settings»
  Common Settings
File with Colour Settings          CO1STD.COL
Report Width                       80
Coordinates                        Decimals
Sound                              Yes
  Settings for Data Entry Module
Data Entry Filter (see Glossary Module)  Maximum Data Set
Structure of One Dataset           x Site-ID's : x LUS Descriptions
Dataset-Display Selection: Admin.Area  » -
Dataset-Display Selection: Project     » -
Dataset-Display Sort Order         Administrative Area
Date Format                        dd/mm/yyyy  (08/03/1995)
UTM Ellipsoid/Spheroid             Geodetic Reference System (GRS) 1980
                                                              «13»
F1=Help F10=Save Enter=Edit
```

The Settings screen is divided into two parts:

Common Settings
> Settings which are applicable in all modules of The Land Use Database (*Section 6.2.1*).

Settings for Data Entry Module
> Settings that are only applicable for the Data Entry Module (*Section 6.2.2*).

After defining the settings, exit and save the settings screen press **F10** or **Esc**. You will return to the main menu of the Data Entry Module (*Section 6.1*).

6.2.1   Common Settings

The common settings are applicable for all modules of The Land Use Database. They are explained below:

File with Colour Settings
> Several files are available containing a set of colour codes which determine the colours (or black and white shades) of displayed messages, picklists and edit screens. It is also possible to create your own colour settings file (see Appendix 2 for instructions). In the Settings screen, the currently selected colour file is shown. To change this, invoke a picklist of available colour files by pressing **Enter**.

```
«Select File with Colour Settings»
BWSTD.COL
CO1STD.COL
CO2STD.COL
LCD.COL
                              «5»
F1=Help
```

BWSTD.COL is a black-and-white settings file (monochrome).
CO1STD.COL is the standard colour settings file.
CO2STD.COL is an alternative colour settings file.
LCD.COL is for LCD screens.

Report Width

This is the maximum number of characters on one line of printed output (to the screen, printer or file). The default number is 80. If your printer can print in condensed format, you can select a higher number in order to get more information on one page. To invoke a picklist from which to select the report width press **Enter**.

```
┌«Select Report Width»┐
│80                    │
│132                   │
│160                   │
│240                   │
│                  «4»─┘
F1=Help
```
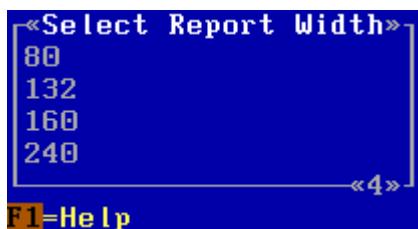
Coordinates

Geographical coordinates (longitudes and latitudes) can be specified in two ways: in degrees and in decimals. To invoke a picklist from which to select the format required press **Enter**.

```
┌«Select Coordinates»──────────┐
│Degrees, Minutes, Seconds (°'")│
│Decimals                       │
│                           «2»─┘
F1=Help
```
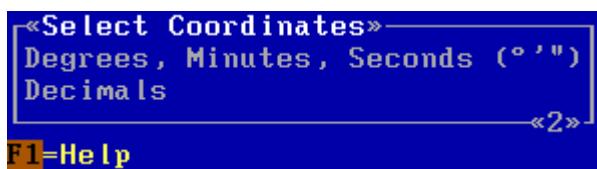
Degrees, Minutes, Seconds (°' ")

Geographical coordinates can be specified in degrees, minutes (1/60 degree) and seconds (1/60 minute).

Decimals

Geographical coordinates can be specified in degrees and decimals of degrees.

Sound

Specify here if the computer must make a sound when errors occur, when swapping between modules, and at termination of a query execution. To change **Yes** into **No** and vice versa press **Enter**.

6.2.2   Settings for Data Entry Module

These settings are only applicable for the Data Entry Module. They are explained below:

Data Entry Filter

A data entry filter can be selected in the **Define Data Entry Filter** option of the Glossary Module (*Section 5.3*). Definition and selection of a data entry filter is very important in order to shape the data entry procedure to the requirements and objectives of your study. To invoke a picklist in which to specify this setting press **Enter**.

```
┌«Data Entry Filter»──────────┐
│Maximum Filter               │
│Minimum Filter               │
│Minimum Filter + Periods     │
│FAO/ITC Training Course      │
│                        «4»──┘
└──────────────────────
F1=Help F3=Print
```
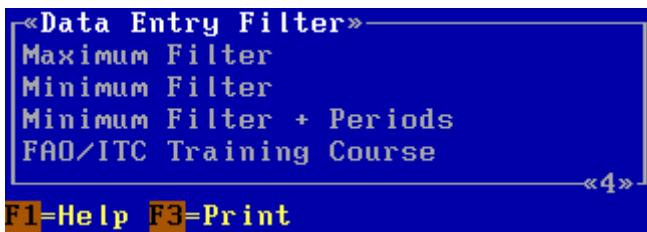
Structure of One Dataset

This setting determines if one dataset (level 1) may contain only one or several site identifications (level 2); and if each site identification (level 2) may contain only one or several land use system descriptions (level 3). Depending on the selection made here, the data entry screens of the first three levels may be presented as one integrated screen or split into several edit screens (*Section 6.4.1*). There are four options available to structure datasets. You are free to change this setting at any moment. When stored land use data with a different dataset structure is edited, the software will automatically adapt to that structure.

To invoke a picklist in which to specify this setting press **Enter**.
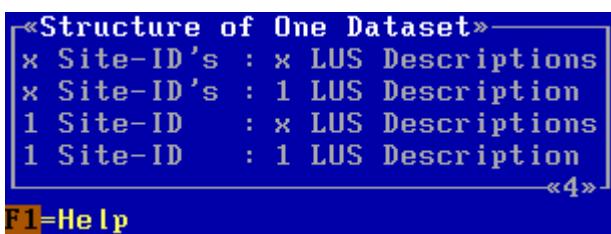
```
┌«Structure of One Dataset»──────┐
│x Site-ID's : x LUS Descriptions│
│x Site-ID's : 1 LUS Description │
│1 Site-ID   : x LUS Descriptions│
│1 Site-ID   : 1 LUS Description │
│                          «4»──┘
└──────────────────────
F1=Help
```

x Site-ID's : x LUS Descriptions

Each dataset (level 1) may contain several site identifications (level 2), of which each may contain several land use system descriptions (level 3). In the data entry procedure, information of each level must be entered in separate edit screens. An example of the structure:

```
Dataset-ID 1 ──────┬─ Site-ID 1 ─┬─ LUS Description 1
                   │             │
                   │             └─ LUS Description 2
                   │
                   └─ Site-ID 2 ─── LUS Description 3
```
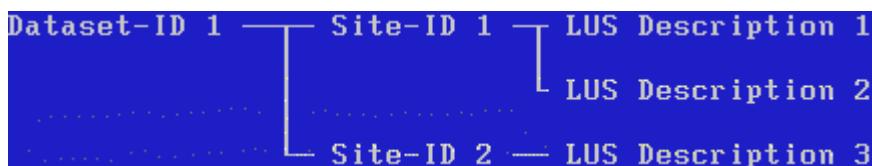
x Site-ID's : 1 LUS Description

Each dataset (level 1) may contain several site identifications (level 2), each of which contains one land use system description (level 3). In the data entry procedure, information of levels 2 and 3 must be entered in an integrated edit screen. An example of the structure:

```
Dataset-ID 1 ──────┬─ Site-ID 1 ── LUS Description 1
                   │
                   └─ Site-ID 2 ── LUS Description 2
```
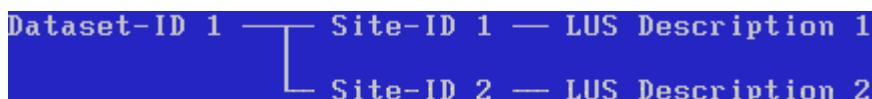
1 Site-ID : x LUS Descriptions

Each dataset (level 1) contains only one site identification (level 2), which may contain several land use system descriptions (level 3). In the data entry procedure,

information of levels 1 and 2 must be entered in an integrated edit screen. An example of the structure:

```
Dataset-ID 1 ——— Site-ID 1 ┬ LUS Description 1
                           │
                           └ LUS Description 2
```
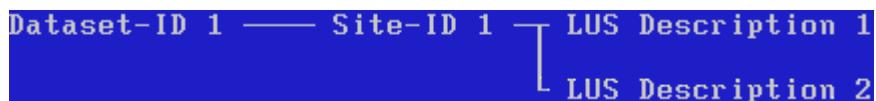
1 Site-ID   : 1 LUS Description

One dataset (level 1) only contains one site identification (level 2), and one land use system description (level 3). In the data entry procedure, information of levels 1, 2 and 3 must be entered in an integrated edit screen. An example of the structure:

```
Dataset-ID 1 ——— Site-ID 1 — LUS Description 1
```

Dataset-Display Selection: Admin. Area

This setting determines from which administrative area, datasets will be displayed in the **Dataset Identifications** picklist (*Section 6.4*). This facilitates the selection of the dataset that you would like to work with. To invoke a picklist in which to specify this setting press **Enter**.

```
┌«Administrative Areas»──────────────────────┐
│Africa                                    » │
│Asia                                      » │
│Australasia; SW-Pacific                   » │
│Europe                                    » │
│North,Centr America; W Indies             » │
│Near-East                                 » │
│S-America                                 » │
└─────────────────────────────────────«7»───┘
 F1=Help F3=Print F4=Search F6=Unspecified Enter=Select
```

Notes

- If the current data entry filter limits the selection of administrative areas, this picklist will only contain the the selected glossary items.
- To remove the specified display selection, press **F6** at the first level of the stacked picklists.

Dataset-Display Selection: Projects

This setting determines from which projects, datasets will be displayed in the Dataset Identifications picklist (*Section 6.4*). This facilitates the selection of the dataset that you would like to work with. To invoke a picklist in which to specify this setting press **Enter**.

```
┌«Projects»──────────────────────────────────┐
│FAO                                       ?»│
│ITC                                       ?»│
└─────────────────────────────────────«4»───┘
 F1=Help F3=Print F4=Search F6=Unspecified Enter=Select
```

See notes under **Dataset-Display Selection: Admin. Area**.

The Land Use Database

Dataset Display Sort Order

This setting determines the sequence in which datasets are displayed in the **Dataset Identification** picklist (see Section 6.4). If a large number of datasets is displayed, sorting the displayed datasets may enhance the overview. Datasets may be sorted by administrative area and by project. To invoke a picklist in which to specify the sort order press **Enter**.

```
┌«Datasets Sorting»─┐
│Administrative Area│
│Project Code       │
│              «2»─┘
 F1=Help
```

Administrative Area

Datasets are sorted according to the administrative area for which the dataset is applicable, i.e. first by continent, then by country, etc. Datasets in the same administrative area are further sorted by dataset number.

Project Code

Datasets are sorted according to the project to which they belong. Datasets belonging to the same project are further sorted by dataset number.

Date Format

Three types of date formats may be used to enter dates in The Land Use Database. To invoke a picklist from which to select a date format press **Enter**.

```
┌«Date Format»─┐
│dd/mm/yyyy    │
│mm/dd/yyyy    │
│yyyy/mm/dd    │
│         «3»─┘
 F1=Help
```

dd/mm/yyyy	The date 13 Febr. 1995 is entered as 13/02/1995.
mm/dd/yyyy	The date 13 Febr. 1995 is entered as 02/13/1995.
yyyy/mm/dd	The date 13 Febr. 1995 is entered as 1995/02/13.

UTM Ellipsoid/Spheroid

A number of ellipsoids and spheroids can be used for UTM projections (see Appendix 4 for more information on using UTM coordinates). To invoke the picklist from which to select an ellipsoid or spheroid press **Enter**.

The following table provides data on included UTM projections.

UTM Ellipsoid/Spheroid	Equat.Rad.	Polar Rad.
Airy 1849	6377563.400	6356256.900
Australian 1965	6378160.000	6356774.700
Bessel (Norway)	6377492.077	6356079.000
Bessel 1841	6377397.200	6356079.000
Clarke 1858	6378293.000	6356619.000
Clarke 1866	6378206.400	6356583.800
Clarke 1880	6378249.100	6356514.900
Clarke IGN 1880	6378249.200	6356515.000
Delambre 1810	6376428.000	6355598.000
Danish Ellipsoid	6377104.000	6355762.000
Everest 1830	6377276.300	6356075.400
Everest 1841	6377397.200	6356079.000
Fischer 1960	6378155.000	6356773.000
Fischer 1968	6378150.000	6356768.000
Global Reference System (GRS) 1980	6378137.000	6356752.300
Hayford 1909	6378388.000	6356909.900
Helmert 1907	6378200.000	6356818.000
Hough 1960	6378270.000	6356794.000
Hughes 1980 (SSMI)	6378273.000	6356889.448
IAU 1965	6378160.000	6356755.000
International 1924	6378388.000	6356911.946
New International 1967	6378157.500	6356772.200
IUGG 1967	6378160.000	6356774.700
Krassovski (1940)	6378245.000	6356863.000
Mercury 1960	6378166.000	6356784.300
Plessis 1817	6376523.000	6355863.000
South East Asia 1960	6378155.000	6356773.000
Struve 1860	6378298.000	6356657.000
Walbeck	6376896.000	6355834.900
World Geodetic System (WGS) 1966	6378145.000	6356759.800
World Geodetic System (WGS) 1972	6378135.000	6356750.500
World Geodetic System (WGS) 1984	6378137.000	6356752.314
Swaziland (Clarke 1880)	6378249.100	6356514.900

6.3   Land Use Data

The Land Use Data option allows you to enter land use data as collected through interviews or from other information sources into the The Land Use Database. Stored data can also be edited using this option. Collected land use information is structured in datasets, i.e. sets of related information as collected during one interview (one questionnaire) or during one study of a secondary data source.

The data entry procedure for datasets is organized in four levels. The sequence of data entry follows these levels. Information is first entered in level 1, then in level 2, etc. The structure of a dataset is shown in Figure 13, the content of the different levels is explained below. The information is entered in fields in edit screens. A complete list of field names grouped by edit screens is included in Appendix 3; a print of a complete dataset is included in Appendix 9.

1   Dataset Identifications
General information that identifies a set of collected land use information, e.g. information on the enumerator, the respondent, the administrative area where the described land use systems are located, and/or the holding to which the studied land use systems belong (*Section 6.4*).

2   Site Identifications
Information to further specify the geographic location of the site in which the studied land use systems are located (map unit, cadastral no.) or parcel sizes (*Section 6.5*).

3 Land Use System Descriptions

General information on the land use system, at the level of the plot or of aggregated plots, e.g. the plot coordinates, plot size, land use purpose, and duration of the operation sequence (*Section 6.6*).

4 Operations and Observations

Detailed information on operations and observations, i.e. type of operation, inputs for operations, and descriptions of observations (*Section 6.7*).

Before using the **Land Use Data** option to enter collected land use information, first perform the following 3 steps:

- Define a data entry filter (*Section 5.3*).
- Select this data entry filter in the settings screen (*Section 6.2.2*).
- Define other Data Entry Module settings (*Section 6.2.2*).
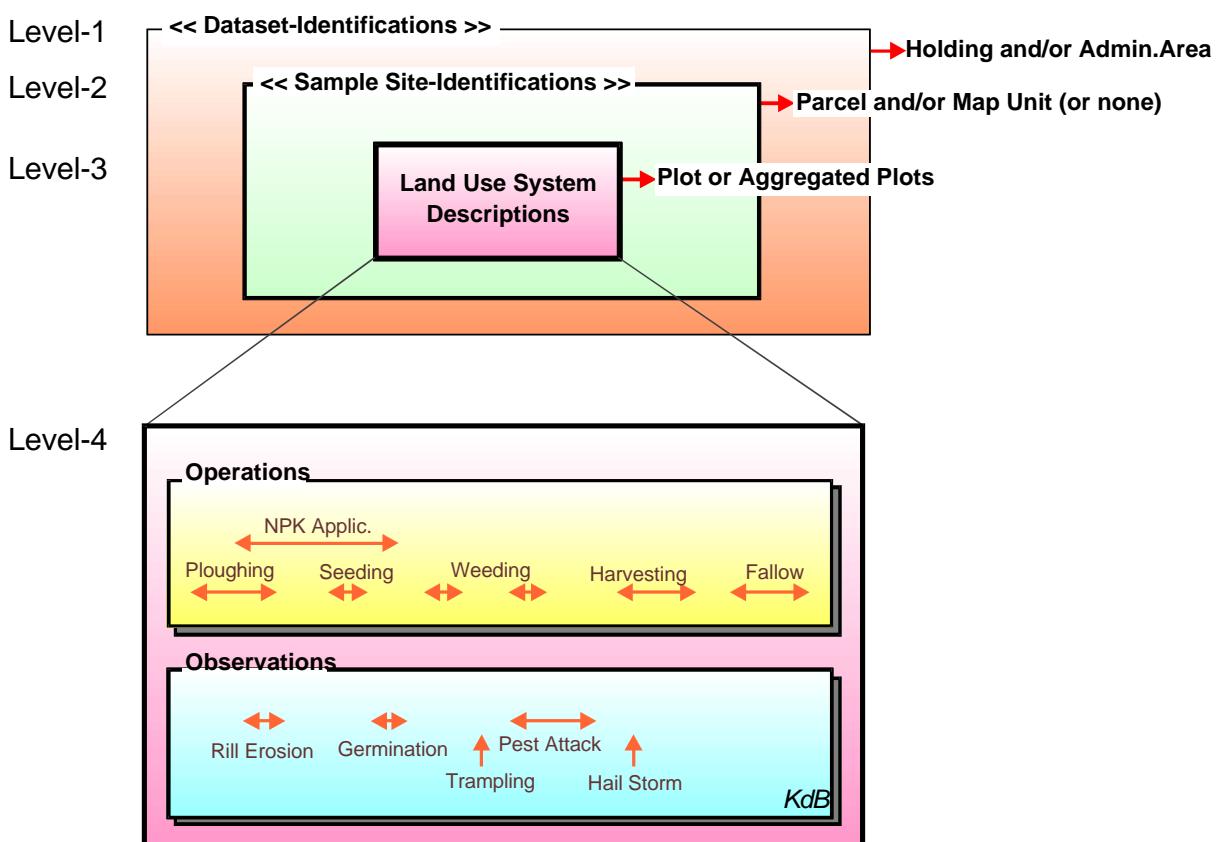
**Figure 13.** **Structure of datasets of Land Use Data in 4 levels. Levels 2 and 3 are spatial subdivisions of levels 1 and 2 respectively; whereas level 4 is a temporal subdivision of the temporal information (operation sequence) of level 3. Note that actual land use information is stored in levels 3 and 4. Entering detailed information on operations and observations in level 4 is not compulsory.**

The Land Use Database

6.4　　Dataset Identifications (Level 1)

Dataset Identification is the first level at which to enter collected land use information. General information about a collected set of land use information can be entered at this level. After you selected Land Use Data from the main menu of the Data Entry Module, the **Dataset Identifications** picklist appears. This picklist is either empty or contains items summarizing information in stored dataset identifications:

The picklist is empty:

```
┌«Dataset Identifications»─────────────────────────────────────────────────────
│                                                                      «0»
│F1=Help Ins=Add
```

This may be due to two reasons:

- No datasets are currently stored in The Land Use Database. To **add** a new dataset press **Ins** (*Section 6.4.1*).
- The stored datasets do not meet the display selections, as defined in the settings screen (*Section 6.2*). To **change** the display filter press **Esc** and select **Settings** from the main menu. Check the display filter settings for administrative areas and projects, and change these if necessary (*Section 6.2.2*).

The picklist contains one or more items:

```
┌«Dataset Identifications»─────────────────────────────────────────────────────
│<Previous Series>
│FAO, ZIMBABWE/91/005 ▶ No:1 ▶ Africa, Zimbabwe, Midlands, Gokwe, Mabalani   »
│FAO, ZIMBABWE/91/005 ▶ No:2 ▶ Africa, Zimbabwe, Midlands, Gokwe, Mabalani   »
│FAO, ZIMBABWE/91/005 ▶ No:3 ▶ Africa, Zimbabwe, Midlands, Gokwe, Thomas     »
│FAO, ZIMBABWE/91/005 ▶ No:4 ▶ Africa, Zimbabwe, Midlands, Gokwe, Thomas     »
│FAO, ZIMBABWE/91/005 ▶ No:5 ▶ Africa, Zimbabwe, Midlands, Gokwe, Thomas     »
│<Next Series>
│                                                                      «5»
│F1=Help F3=Print F5=Copy F10=Edit Ins=Add Del=Delete Enter=Select
```

One or more datasets were entered, and one or more of these meet the display selection defined in the setting screen (*Section 6.2*).

The items in this picklist contain summarized information about stored dataset identifications. An explanation: **FAO, ZIMBABWE/91/005　No :5　Africa, Zimbabwe, Midlands, Gokwe, Thomas** means that the dataset is collected within the **FAO, ZIMBABWE/91/005** project, for this project it is dataset number **17**, and the administrative area in which it was collected is **Africa, Zimbabwe, Midlands, Gokwe, Thomas**.

Several options are now available:

- To **go to the second level** for the highlighted dataset identification (**Site Identifications**) press **Enter** (*Section 6.5*). Depending on the structure of a dataset as selected in the Settings screen (*Section 6.2.2*) you may also go to the third or fourth level by pressing **Enter**. You will go to level 2 when **x Site-ID's : x LUS Descriptions** or **x Site-ID's : 1 LUS Description** were selected; to level 3 when **1 Site-ID : x LUS Descriptions** was selected, or to level 4 when **1 Site-ID : 1 LUS Description** was selected.

- To **exit** this picklist press **Esc**. You will return to the main menu of the Data Entry Module (*Section 6.1*).
- To **add** a dataset identification press **Ins** (*Section 6.4.1*).
- To **edit** the highlighted dataset identification press **F10** (*Section 6.4.1*).
- To **print** the highlighted dataset identification plus all related data at lower levels press **F3** (*Section 6.4.4*).
- To **copy** the highlighted dataset identification press **F5** (*Section 6.4.3*).
  To **delete** the highlighted dataset identification press **Del**. All information of the highlighted dataset will be deleted, including all related data at lower levels (*Section 4.3.3*).

6.4.1   Add/Edit a Dataset Identification

To add a new dataset identification or to edit an existing one, information must be entered or edited in an edit screen. After you pressed **Ins** or **F10** in the **Dataset Identifications** picklist, the following edit screen appears:

```
┌«Add/Edit a Dataset Identification»─────────────────────────┐
│ Administrative Area : »                                    ↑
│ Project             : »                                     
│ Dataset Number      :     0                                 
│ Dataset Type        : Actual                                
│ Enumeration Date    : -                                     
│ Enumerator's Name   : -                                     
│ Respondent's Name   : -                                     
│ Holder's  Name      : -                                     
│ Holding Location - Geographic Coordinates                   
│ - Latitude (↕ or y) : »         :    °  '  " [Degrees]      
│ - Longitude (↔ or x): »         :    °  '  " [Degrees]      
│ Holding Location - UTM Projection                           
│ - Ellipsoid/Spheroid: Clarke 1866                           
│ - UTM Zone          :        -                              
│ - Northing          :   -        [Meters]                   
│ - Easting           :   -        [Meters]                   
│ Holding Size        :   -     -   -        [Min - Max]      
│ - Unit              : »                                     
│ - Info Source       : »                                     
│ Comments            :                                      ↓
└────────────────────────────────────────────────────────────┘
```

The contents of this edit screen depends on two factors:

1. The number of fields in the screen depends on the selected data entry filter (*Section 6.2.2*). In the above example, the **Maximum Filter** was selected.

2. Fields of more than one data entry level may be combined in one edit screen, e.g. fields of level 1 and level 2, or of level 1, 2, and 3. This depends on the structure of one dataset, as defined in the settings screen (*Section 6.2.2*). In the above example, **x Site - ID's : x LUS Descriptions** was selected.

Three examples of edit screens are shown corresponding to different selections of dataset structures (in the Settings screen). All examples are based on the standard data entry filter **Minimum Filter** (only compulsory fields are included in the data entry screens).

The first example shows only fields of level 1, after selection of **x Site -ID's : x LUS Descriptions** or **x Site-ID's : 1 LUS Description** as dataset structure:

```
┌«Add/Edit a Dataset Identification»──────────────────────────────
  Administrative Area : »
  Project             : »
  Dataset Number      :    0
  Dataset Type        : Actual
```

The second example shows fields of levels 1, 2 and 3 in an integrated edit screen, after selection of **1 Site-ID : 1 LUS Description** as dataset structure (*Sections 6.5 and 6.6*):

```
┌«Add/Edit Levels 1, 2 and 3»─────────────────────────────────────
  ──1.  Dataset Identification────────────────────────────────────
  Administrative Area : »
  Project             : »
  Dataset Number      :    0
  Dataset Type        : Actual
  ──2.  Site Identifications──────────────────────────────────────
  Plot Aggregation    : Each LUS Description is valid for one Plot
  ──3.  Land Use System Descriptions─────────────────────────────
  A-Priori LU Class   : »
  – Species/Service    : *
```

The third example shows fields of level 1 and 2 in an integrated edit screen, after selection of **1 Site-ID : x LUS Descriptions** as dataset structure (*Section 6.6*):

```
┌«Add/Edit Levels 1 and 2»────────────────────────────────────────
  ──1.  Dataset Identification────────────────────────────────────
  Administrative Area : »
  Project             : »
  Dataset Number      :    0
  Dataset Type        : Actual
  ──2.  Site Identifications──────────────────────────────────────
  Plot Aggregation    : Each LUS Description is valid for one Plot
```

When the **Add/Edit a Dataset Identification** screen is displayed, enter the applicable information in the provided fields (*Section 4.2.4*). Three fields of this edit screen are compulsory: **Administrative Area**, **Project**, **Dataset Number** and **Dataset Type**. The combination of **Administrative Area**, **Project** and **Dataset Number** must be unique for all datasets stored. The program will automatically check if these requirements are fulfilled when saving the edit screen. All fields of the **Add/Edit a Dataset Identification** screen are explained in *Section 6.4.2*.

When you have completed entering or editing information in the **Add/Edit a Dataset Identification** screen, you can exit the screen:

- To save and exit press **F10**.
- To **exit without saving** press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to the Dataset Identifications picklist (*Section 6.4*).

6.4.2   Fields of Dataset Identification

The meaning and usage of all fields of the **Add/Edit a Dataset Identification** screen are briefly explained below, in the sequence as they appear in the edit screen.

The type of field (as put between parenthesis) determines what type of information can be entered in the field: (**>>**) an item from a picklist; (-) numbers or text; and (*) another edit screen is invoked. For **>>** fields in which items are selected from glossary trees, the number of possible selections may be limited when glossary items are pre-selected in the data entry filter (*Section 5.3*).

Administrative Area (**>>**)

> The administrative area in which the described land use systems are located. It must always be specified, but can optionally be defined as "**Unspecified**" by pressing **F6**. The administrative area allows you to link data stored in The Land Use Database with a Geographic Information System (GIS) in which the administrative areas are known.

Project (**>>**)

> The project responsible for the collection of this dataset. It must always be specified, but can optionally be defined as "**Unspecified**" by pressing **F6**.

Dataset Number (**-**; **only numbers**)

> The number that identifies this dataset, e.g. a survey record or sequence number. It must always be specified.

Dataset Type (**>>**)

> Definition whether the data in the dataset are actual (real) or hypothetical (imaginary). Only these two options are available, of which one must be selected.

Enumeration Date (**-**; **only numbers**)

> The date when the data were collected, e.g. the date the interview was conducted. Use the format that is shown between parentheses in the information bar. The date format is defined in the settings screen (*Section 6.2*). For example, if the date format shown in the information bar is **mm/dd/yyyy**, the date 13 February 1995 must be entered as **02/13/1995**. You can also enter it as **02/13/95**.

Enumerator's Name (**-**)

> The name of the person(s) who collected this dataset, e.g. the interviewer or the person who collected the data from secondary sources.

Respondent's Name (**-**)

> The name of the person who is interviewed, this may be the holder of the land, but also a labourer, tenant or guardian.

Holder's Name (**-**)

> The name of the person who has management control over the holding to which the described land use system(s) belong, i.e. the name of the land user. This name may link to a similar name in other databases.

Holding Location - Geographic Coordinates
Holding Location - UTM Projection

> The location (point) of the holding, i.e. the place of residence or the office of the holder. Geographic coordinates (**- Latitude** and **- Longitude**) or UTM projections (**- Ellipsoid**, **- UTM Zone**, **- Northing** and **- Easting**). For explanation on coordinates, see Appendix 4.

Holding Size (-; **only numbers**)

The size of the holding (area of land managed). If the holding size cannot be specified accurately, enter a (estimated) range: first enter the minimum size and subsequently the maximum.   If the size is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum size.

- Unit (>>)

The data unit in which the holding size is expressed, usually an area. If the size is entered, the unit must always be specified.

- Info Source (>>)

The source from which the informations on holding size was obtained. If this field is shown in the edit screen, and in case a size was entered, the information source must be entered.

Comments (-)

Additional information about this dataset identification. The comments are entered in a free text window (*Section 4.2.5*). They must be applicable for the information entered in this edit screen, e.g. enumerator's impression on reliability of the interview, or behaviour of the respondent. No additional information should be given on the value in a   field, since such information belongs in the glossary, i.e. either in existing glossary items or in glossary items yet to be defined.

6.4.3   Copy a Dataset Identification

Copying a dataset identification, including related data at lower levels, may be time efficient in case a new dataset is very similar to an existing one. Editing a copied dataset may be less time consuming than entering all information.   After pressing **F5** in the **Dataset Identification** picklist, an edit screen appears in which you can specify the destination of the new dataset:

```
«Copy a Dataset Identification»
 From:
 Administrative Area : Africa, Swaziland, Manzini, Malkerns
 Project             : FAO, SWAZILAND/89/001
 Dataset Number      :        79
 To:
 Administrative Area : »
 Project             : »
 Dataset Number      :         0
 Copy lower Levels   : Yes
```

To: Administrative Area
**   Project**
**   Dataset Number**

Enter the administrative area, project and dataset number of the new dataset identification (*Section 6.4.2*). The combination of administrative area, project and dataset number must be unique. The program will check this automatically.

Copy Lower Levels

Related data stored at lower levels of the copied dataset may also be copied to the new dataset identification. Press **Enter**. A picklist is invoked from which to select **Yes** or **No**.

After entering information in the above fields, start copying by pressing **F10**. The new dataset identification will be the highlighted item in the Dataset Identifications picklist that is displayed after copying.

6.4.4   Print a Dataset Identification

All information stored in a dataset may be printed to a printer, the screen or a text file. After pressing **F3** in the **Dataset Identifications** picklist, the next picklist appears:

```
┌«Print which?»─────────────────────────────┐
│Highlighted Dataset Identification          │
│All Dataset Identifications in this Picklist│
│                                      «2»┘
F1=Help Enter=Select
```

Highlighted Dataset Identification
> All data of the highlighted dataset identification plus all related data at lower levels are printed.

All Dataset Identifications in this picklist
> All data of all **Dataset Identifications** included in the current picklist are printed plus all related data at lower levels. This includes the datasets of all next and/or previous series which are not displayed in the shown part of the picklist. Stored datasets that are not included in the display selection (*Section 6.2.2*) will not be printed. **Warning**: Printing all datasets may be time consuming. It is not possible to interrupt the printing procedure.

After selecting an item, a picklist is invoked in which to select the output device for the printed information. An example print of a complete dataset is included in Appendix 9.

For further instructions on the printing procedure see *Section 4.3.2*.

6.5   Site Identifications (Level 2)

"Site Identification" is the second level at which to enter collected land use information. Information about the mapping unit or parcel in which the described land use systems are located, may be entered at this level.

After you selected an item from the **Dataset Identifications** picklist (by pressing **Enter**), the **Site Identifications** picklist is displayed. This picklist is either be empty or contains items summarizing information in stored site identifications:

- The picklist is empty:

```
«1. │FAO, ZIMBABWE/91/005 ▶ No:61 ▶ Zimbabwe, Mashonaland East, Mutoko, Mugom»
┌«2. │Site Identifications»──────────────────────────────────────────────────
│                                                                      «▯»┘
F1=Help Ins=Add
```
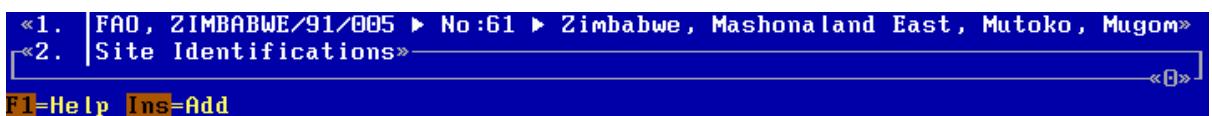
No site identifications were stored for the current dataset identification (**FAO, ZIMBABWE/91/005 >> No:61 >> Zimbabwe, Mashonaland East, Mutoko, Mugom**). There are two options:

- To **add** a new site identification press **Ins** (*Section 6.5.1*).
- To **exit** this picklist press **Esc**. You will return to the Dataset Identifications picklist (*Section 6.4*).

- The picklist contains one or more items:
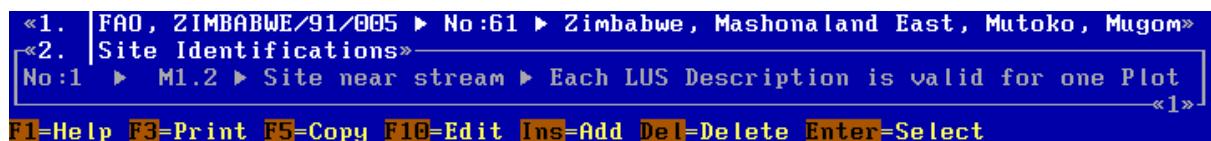
```
«1. │FAO, ZIMBABWE/91/005 ▶ No:61 ▶ Zimbabwe, Mashonaland East, Mutoko, Mugom»
«2. │Site Identifications»─────────────────────────────────────────────────
No:1   ▶  M1.2 ▶ Site near stream ▶ Each LUS Description is valid for one Plot
                                                                        «1»
F1=Help F3=Print F5=Copy F10=Edit Ins=Add Del=Delete Enter=Select
```

One or more site identifications were stored for the current dataset identification (**FAO, ZIMBABWE/91/005 >> No:61 >> Zimbabwe, Mashonaland East, Mutoko, Mugom**).

Each item in this picklist refers to one site identification. For example, **No:1 >> M1.2 >> Site near stream >> Each LUS Description is valid for one Plot** refers to site identification no 1 of the current dataset identification (the number is determined by the program), located in map unit M1.2, named **Site near stream**, and in which each land use system description is valid for one plot.

Several options are now available:

- To **go to the third level** (**Land Use System Descriptions**) of the highlighted site identification press **Enter** (*Section 6.6*). Depending on the structure of a dataset as selected in the Settings screen (*Section 6.2.2*), you may also go to the fourth level by pressing **Enter**. You will go to level 3 when **x Site-ID's : x LUS Descriptions** was selected; and to level 4 when **x Site-ID's : 1 LUS Description** was selected.
- To **exit** this picklist press **Esc**. You will return to the Dataset Identifications picklist (*Section 6.4*).
- To **add** a new site identification press **Ins** (*Section 6.5.1*).
- To **edit** the highlighted site identification press **F10** (*Section 6.5.1*).
- To **print** all information of the current dataset press **F3**. All information of the complete dataset to which the site identifications in the picklist belong, is printed (see example in Appendix 9 and *Section 4.3.2*).
- To **copy** the highlighted site identification press **F5** (*Section 6.5.3*).
- To **delete** the highlighted site identification press **Del**. All data of this site identification plus all related information at lower levels is deleted (*Section 4.3.3*).

6.5.1   Add/Edit a Site Identification

To add a new site identification or to edit an existing one, information must be entered or edited in an edit screen. After you pressed **Ins** or **F10** in the **Site Identification** picklist, the following edit screen appears:

```
«Add/Edit a Site Identification»
 Plot Aggregation      : »                                            ↑
 Site Name             : -
 Mapping Unit-ID       : -
 - Comp./Element-ID    : -
 - Map Comments        : -
 Tenancy Arrangement   : »
 Cadastral Number      :
 Parcel Size           :   -        -   -          [Min - Max]
 - Unit                : »
 - Info Source         : »
 Distance to Holding   :   -        -   -          [Min - Max]
 - Unit                : »
 - Info Source         : »
 Comments              :                                              ↓
```

The contents of this edit screen depends on two factors:

1.   The number of fields in the screen depends on the selected data entry filter (*Section 6.2.2*). In the above example, the **Maximum Filter** was selected.

2.   Fields of more than one data entry level may be combined in one edit screen, i.e. fields of level 2 and 3. This depends on the structure of one dataset, as defined in the settings screen (*Section 6.2.2*). In the above example, **x Site -ID's : x LUS Descriptions** was selected.

Two examples of edit screens are shown corresponding to different selections of dataset structures (in the Settings screen). They are based on the standard data entry filter **Minimum Filter** (only compulsory fields are included in the data entry screens). The first example shows only one field of level 2, after selection of **x Site -ID's : x LUS Descriptions** as dataset structure:

```
«Add/Edit a Site Identification»
 Plot Aggregation    : Each LUS Description is valid for one Plot
```

The second example shows fields of levels 2 and 3 in an integrated edit screen, after selection of **x Site-ID's: 1 LUS Description** as dataset structure (for explanation on level 3 see *Section 6.6*):

```
«Add/Edit Levels 2 and 3»
 ─2.  Site Identifications
 Plot Aggregation    : Each LUS Description is valid for one Plot
 ─3.  Land Use System Descriptions
 A-Priori LU Class   : »
 - Species/Service    : *
```

When the **Add/Edit a Site Identification** screen is displayed, enter the applicable information in the provided fields (for general information on using edit screens see *Section 4.2.4*). Only one field of this edit screen is compulsory: **Plot Aggregation**. All fields of **Add/Edit a Site Identification** screen are explained in *Section 6.5.2*.

When you have completed entering or editing information in the **Add/Edit a Site Identification** screen, you can exit the screen:

- To save and exit press **F10**.
- To **exit without saving** press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to the Site Identifications picklist (*Section 6.5*).

6.5.2   Fields of Site Identification

The meaning and usage of all fields of the **Add/Edit a Site Identification** screen are briefly explained below, in the sequence as they appear in the edit screen.

The type of field (as put between parenthesis) determines what type of information can be entered in the field: (**>>**) an item from a picklist; (**-**) numbers or text; and (*****) another edit screen is invoked. For **>>** fields in which items are selected from glossary trees, the number of possible selections may be limited when glossary items are pre-selected in the data entry filter (*Section 5.3*).

Plot Aggregation
Descriptions of land use systems may be generalised for a number of plots, e.g. a general description about the labour inputs of all land use systems with maize in a certain mapping unit, or in a district (*Section 2.2.8*). In this field you determine if the land use system descriptions, which are entered at levels 3 and 4, are generalised descriptions for a number of aggregated plots or that each land use system description is plot-specific. These two options are shown in a picklist from which you must select one:

Each LUS Description is valid for one plot
Each land use system description that is entered at the next levels is plot-specific.

Each LUS Description is Generalised for Several Aggregated Plots
Each land use system description that is entered at the next levels is generalised for a number of aggregated plots. After selecting this option a warning appears, telling you that data of several fields in this edit screen are lost, as these fields are not further applicable: **Cadaster Number**, **Parcel Size** and **Distance to Holding**.

Site Name (**-**)
A name or nickname to recall the site, e.g. "near the stream".

Mapping Unit-ID (**-**)
A code or name that identifies the mapping unit in which the site is located. The mapping unit-ID allows you to link data stored in The Land Use Database with a Geographic Information System (GIS) in which the mapping units are known. Also hard copy maps may be referred to; these must be properly documented in the glossary tree 'Projects' for the glossary item describing the current project.

- Comp./Element-ID (**-**)
A code or name that identifies a component or element within a mapping unit, in which the site is located. This field can be used if the mapping unit is a complex unit, linked to more than one legend item.

- Map Comments (**-**)
Additional information about the used map, regarding inconsistencies or omissions with respect to the observed situation of the site. For example, when agricultural fields are

observed in an area that was mapped as rangeland. Comments are entered in a free text window (*Section 4.2.5*).

Tenancy Arrangements (**>>**)

The arrangements or rights according to which the holder uses the parcel (cannot be specified when **Each LUS Description is Generalised for Several Aggregated Plots** is selected for **Plot Aggregation**).

Cadastral Number (**-**)

The registration number of the parcel in the national cadaster (cannot be specified when **Each LUS Description is Generalised for Several Aggregated Plots** is selected for **Plot Aggregation**). This number may link to a similar number in the corresponding database.

Parcel Size (**-**; **only numbers**)

The size of the parcel (cannot be specified when **Each LUS Description is Generalised for Several Aggregated Plots** is selected for **Plot Aggregation**). If the parcel size cannot be specified accurately, enter a (estimated) range: first enter the minimum size and subsequently the maximum. If the size is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum size.

- Unit (**>>**)

The data unit in which the parcel size is expressed, usually an area. If the size is entered, the unit must always be specified.

- Info Source (**>>**)

The source from which the information on parcel size was obtained. If this field is shown in the edit screen, and in case a size was entered, the information source must be entered.

Distance to Holding (**-**; **only numbers**)

The distance from the parcel to the holding. If the distance to the holding cannot be specified accurately, enter a (estimated) range: first enter the minimum distance and subsequently the maximum. If the size is known exactly, enter the same value for minimum and maximum, i.e. accept the default value for the maximum size.

- Unit (**>>**)

The data unit in which the distance to the holding is expressed, usually a linear measure (and occasionally expressed in time required to get from the holding to the site). If the size is entered, the unit must always be specified.

- Info Source (**>>**)

The source from which the information on distance to holding was obtained. If this field is shown in the edit screen, and in case a distance was entered, the information source must be entered.

Comments (**-**)

Additional information about this site identification. The comments are entered in a free text window (*Section 4.2.5*). They must be applicable for the information entered in this edit screen, e.g. additional description of the parcel, or information as seen from aerial photographs or satellite images. No additional information should be given on the value in a **>>** field, since such information belongs in the glossary, i.e. either in existing glossary items or in glossary items yet to be defined.

6.5.3 Copy a Site Identification

Copying a site identification, including related data at lower levels, may be time efficient in case a new sample site identification is very similar to an existing one. After pressing **F5** in the **Site Identification** picklist, an edit screen is displayed:

```
┌«Copy a Site Identification»──────────────────────────────────────┐
│ Copy lower Levels : Yes                                          │
└─────────────────────────────────────────────────────────────────┘
```

Copy lower Levels

> Related data stored at lower levels of the copied site identification may also be copied to the new site identification. Press **Enter** to invoke a picklist from which to select **Yes** or **No**.

After entering information in the above field, start copying press **F10**. The new site identification will be the highlighted item in the Site Identifications picklist that is displayed after copying.

6.6 Land Use System Descriptions (Level 3)

"Land Use System Description" is the third level at which to enter collected land use information. General information about the land use system, at the level of the plot and for the operation sequence, may be entered at this level.

After you selected an item from the **Site Identifications** picklist (by pressing **Enter**), the **Land Use System Descriptions** picklist is displayed. This picklist is either be empty or contains items summarizing information in stored land use system descriptions:

- The picklist is empty:

```
«1. │FAO, ZIMBABWE/91/005 ▶ No:61 ▶ Zimbabwe, Mashonaland East, Mutoko, Mugom»
«2. │No:1  ▶  M1.2 ▶ Site near stream ▶ Each LUS Description is valid for one»
┌«3. │Land Use System Descriptions»──────────────────────────────────────────
│                                                                      «[]»
F1=Help Ins=Add
```

No land use systems descriptions were stored for the current site identification (**No:1 >> M1.2 >> Site ...**). There are two options:
- To **add** a new land use system description press **Ins** (*Section 6.6.1*).
- To exit this picklist press **Esc**. You will return to the **Site Identifications** picklist (*Section 6.5*).

- The picklist contains one or more items:

```
«1. │FAO, ZIMBABWE/91/005 ▶ No:61 ▶ Zimbabwe, Mashonaland East, Mutoko, Mugom»
«2. │No:1  ▶  M1.2 ▶ Site near stream ▶ Each LUS Description is valid for one»
┌«3A.│Land Use System Descriptions»─────────────────────────────────────────
│No:1 ▶ 21/10/1992 - 15/11/1993 ▶ FAO-Field Test Africa, Single Cropping
│                                                                       «1»
F1=Help F3=Print F5=Copy F10=Edit Ins=Add Del=Delete Enter=Select
```

One or more land use system descriptions were stored for the current site identification (**No:1 >> M1.2 >> Site ...**).

Each item in this picklist refers to a land use system description. For example, **No:1 21/10/1992 - 15/11/1993   FAO-Field Test Africa, Single Cropping**   refers to land use system description no. 1 of the current site identification (this number is determined by the program), which has an operation sequence from 21 October 1992 to 15 November 1993, and belongs to the *a-priori* land use class **FAO-Field Test Africa, Single Cropping**.

Several options are now available:
- To **go to the fourth level** (**Operations and Observations**) of the highlighted land use system description press **Enter** (*Section 6.7*).
- To **exit** this picklist press **Esc**. You will return to the **Site Identifications** picklist (*Section 6.5*).
- To **add** a new land use system description press **Ins** (*Section 6.6.1*).
- To **edit** the highlighted land use system description press **F10** (*Section 6.6.1*).
- To **print** all information of the current dataset press **F3**. All information of the complete dataset to which the land use system descriptions in the picklist belong, is printed (see example in Appendix 9 and *Section 4.3.2*).
- To **copy** the highlighted land use system description press **F5** (*Section 6.6.5*).
- To **delete** the highlighted land use system description press **Del**. All data of this land use system description plus all related information at lower levels is deleted (*Section 4.3.3*).

6.6.1   Add/Edit a Land Use System Description

To add a new land use system description or to edit an existing one, information must be entered or edited in an edit screen. After you pressed **Ins** or **F10** in the **Land Use System Descriptions** picklist, the following edit screen appears:

```
┌«Add/Edit a Land Use System Description»─────────────────────────────┐
│ Plot Location      - Geographic Coordinates                        ↑│
│ - Latitude (‡ or y) : »        :    °  '  " [Degrees]               │
│ - Longitude (↔ or x): »        :    °  '  " [Degrees]               │
│ Plot Location      - UTM Projection                                │
│ - Ellipsoid/Spheroid: Clarke 1866                                  │
│ - UTM Zone          :      -                                       │
│ - Northing          :  -          [Meters]                         │
│ - Easting           :  -          [Meters]                         │
│ Plot Size           :  -       -   -       [Min - Max]             │
│ - Unit              : »                                            │
│ - Info Source       : »                                            │
│ - Boundaries        : »                                            │
│ Infrastructure      : *                                            │
│ Soil Sample-ID      : -                                            │
│ Op. Seq. Period     : -        - -         [Start - End Date]      │
│ A-Priori LU Class   : »                                            │
│ Land Use Purpose    : *                                            │
│ Comments            :                                             ↓│
└────────────────────────────────────────────────────────────────────┘
```

The number of fields in this edit screen depends on the selected data entry filter (*Section 6.2.2*). In the above example, the **Maximum Filter** is used. If you select the **Minimum Filter**, only the following two compulsory fields will be shown:

```
«Edit Land Use System Description»
 A-Priori LU Class  : »
 - Species/Service  : *
```

When the **Add/Edit a Land Use System Description** screen is displayed, enter the applicable information in the provided fields (for general information on using edit screens see *Section 4.2.4*). One field of this edit screen is compulsory: **A-Priori LU Class**. All fields of **Add/Edit a Land Use System Description** screen are explained in *Section 6.6.2*.

When you have completed entering or editing information in the **Add/Edit a Land Use System Description** screen, you can exit the screen:

- To save and exit press **F10**.
- To **exit without saving** press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to the **Land Use System Descriptions** picklist (*Section 6.6*).

6.6.2 Fields of Land Use System Description

The meaning and usage of all fields of the **Add/Edit a Land Use System Description** screen are briefly explained below, in the sequence as they appear in the edit screen.

The type of field (as put between parenthesis) determines what type of information can be entered in the field: (**>>**) an item from a picklist; (**-**) numbers or text; and (*****) another edit screen is invoked. For **>>** fields in which items are selected from glossary trees, the number of possible selections may be limited when glossary items are pre-selected in the data entry filter (*Section 5.3*).

Plot Location - Geographic coordinates
Plot Location - UTM Projection
   The location (point) of the plot, i.e. the contiguous piece of land on which the described land use takes place. Geographic coordinates (**- Latitude** and **- Longitude**) or UTM projections (**- Ellipsoid**, **- UTM Zone**, **- Northing** and **- Easting**). For explanation on coordinates, see Appendix 4.

Plot Size (**-**; **only numbers**)
   The size of the plot on which the described land use system is practised. If the plot size cannot be specified accurately, enter a (estimated) range: first enter the minimum size and subsequently the maximum. If the size is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum size.

- Unit (**>>**)
   The data unit in which the plot size is expressed, usually an area. If the size is entered, the unit must always be specified.

- Info Source (**>>**)
   The source from which the information on plot size was obtained. If this field is shown in the edit screen, and in case a size was entered, the information source must be entered.

Infrastructure (*)

Information on infrastructure in or outside the plot that may be used during the operation sequence and which is present at the start date of the operation sequence, is entered in the **Add/Edit an Infrastructure** edit screen (*Section 6.6.3*).

Soil Sample-ID (-)

A number or code that uniquely identifies a soil sample taken at the plot. This ID may be linked to a similar ID in a soil database.

Op. Seq Period (-; **only numbers**)

The start and end dates of the described operation sequence. The start date is entered in the left field, the end date in the right. Dates can be entered in two ways:

- As absolute date, following the Gregorian calendar. The date format (either **dd/mm/yyyy**, **mm/dd/yyyy** or **yyyy/mm/dd**) is defined in the settings screen (*Section 6.2*) and is shown in the information bar. For example, the date 16 June 1994 is entered as **16/06/1994**, **06/16/1994** or **1994/06/16**, depending on the date format.
  - If dates cannot be specified accurately, the day may be left blank or entered as an asterisk *, e.g. ****/06/1994** (some day in June 1994).
  - If the month cannot be specified, it may also be left blank or entered with and asterisk, e.g. ****/**/1994** (some day in 1994).
  - The year may also be left blank, e.g. in order to indicate a period which is repeated every year, e.g. ****/07/**** (in July of each year).
  - If qualitative periods such as 'the first week of April' are given, transform them to dates following the list in Appendix 7.

  Dates from other calendar systems, e.g. the Ethiopian calendar with 13 months, must be translated to Gregorian dates before entering.

- As relative date, ranging from -3000 to 3000. Sometimes, a land user cannot specify a calendar date, or the calendar date cannot be reconstructed from his information, e.g. the start date is referred to as "one week after the first rain". In that case, a relative date can be used. This is a number of days before (with negative values) or after (with positive values) a reference date, which has the value "zero". The reference date may be "the day of the first rain". If you enter relative dates, information on the reference date must be either in the **Comments** field of this edit screen, or as an observation ("first rain" at date "zero") in the **Add/Edit an Observation** edit screen (*Section 6.7.7*).

A-Priori LU Class (**>>**)

The *a-priori* land use class to which this land use system belongs. Land use classes can be defined and edited with the option **Land Use Classes** from the main menu of the Data Entry Module (*Section 6.8*). A land use class must always be specified. If no land use classes are available, you must define them first (*Section 6.8*). The land use purpose classifier of the a-priori land use class will act as a filter when specifying data for land use purpose (next field).

Land Use Purpose (*)

Information on the purpose of the land use, i.e. the [Species/Service-Product/Benefit] combination and on the quantity of the product or benefit obtained is entered in the **Add/Edit Land Use Purpose and Quantity** edit screen. This edit screen can only be invoked after information is entered in the **A-Priori LU Class** field (*Section 6.6.4*).

113

Comments (**-**)

Additional information about this land use system description. The comments are entered in a free text window (*Section 4.2.5*). They must be applicable for the information entered in this edit screen, e.g. additional information on the followed rotation, crop calendar or cropping system. When relative dates are used, the "zero" date can be defined here as well. No additional information should be given on the value in a **>>** field, since such information belongs in the glossary, i.e. either in existing glossary items or in glossary items yet to be defined.

6.6.3   Add/Edit an Infrastructure

After pressing **Enter** at the **Infrastructure** field in the **Add/Edit a Land Use System Description** screen, a new edit screen is invoked in which to enter information on the type and quantity of one infrastructure.

```
«Add/Edit an Infrastructure»
 Infrastructure       : »
 Quantity             :   -        -   -          [Min - Max]
 - Unit               : »
 - Info Source        : »
```

The number of fields in this edit screen depends on the selected data entry filter (*Section 6.2.2*). In the above example the **Maximum Filter** was selected.

Enter or edit the applicable information in the provided fields of the edit screen. One field of this edit screen is compulsory: **Infrastructure**.

Infrastructure (**>>**)

The type of infrastructure in or outside the plots, that may be used during the operation sequence and which is present at the start date of the operation sequence. For example, "all-weather roads", "fences".

Quantity (**-**; **only numbers**)

The quantity of the specified infrastructure. If the quantity cannot be specified accurately, enter a (estimated) range: first enter the minimum quantity and subsequently the maximum. If the quantity is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum quantity.

- Unit (**>>**)

The data unit in which the infrastructure quantity is expressed, which may be an area, a linear measure, a number, etc. If the quantity is entered, the unit must always be specified.

- Info Source (**>>**)

The source from which the information on infrastructure quantity was obtained. If this field is shown in the edit screen, and in case a quantity was entered, the information source must be entered.

When you have completed entering or editing information in the **Add/Edit an Infrastructure** screen, you can exit the screen:
- To save and exit press **F10**.
- To exit without saving press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to the **Add/Edit a Land Use Description** screen (*Section 6.6.1*). If a new infrastructure was specified, information about an additional infrastructure can be entered, using the same procedure. In this way, many infrastructure may be specified, as shown in the following part of the edit screen:

```
┌«Add/Edit a Land Use System Description»─────────────────────────────────┐
│ Infrastructure         : Plot Structures / Works, Fences, made of Branches │
│                          Plot Structures / Works, Irrigation Structures, » │
│                          General Farm Structures, Farm Buildings, Residential │
│                          General Farm Structures, Roads & paths            │
│                          *                                                 │
└─────────────────────────────────────────────────────────────────────────┘
```

6.6.4   Add/Edit a Land Use Purpose and Quantity

After pressing **Enter** at the **Land Use Purpose** field in the **Add/Edit a Land Use System Description** screen, a new edit screen is invoked in which to enter information on one [Species/Service-Product/Benefit] combination and its quantity:

```
┌«Add/Edit a Land Use Purpose and Quantity»───────────────────────────────┐
│ Species/Service        : »                                              │
│ Product/Benefit        : »                                              │
│ ──────────────────────────────────────────────────────────────────────│
│ Product Quantity       : -          - -          [Min - Max]           │
│ - Unit                 : »                                              │
│ - Info Source          : »                                              │
└─────────────────────────────────────────────────────────────────────────┘
```

The number of fields in this edit screen depends on the selected data entry filter (*Section 6.2.2*). In the above example the **Maximum Filter** was selected.

When the edit screen is displayed, enter the applicable information in the provided fields (for general informations on using edit screens see *Section 4.2.4*). One field of this edit screen is compulsory: **Species/Service**.

Species/Service (**>>**)
      The (type of) species grown or rendered or the service provided. Only those species and services as specified in the selected *a-priori* land use class may be selected. For example, if **Single Cropping of Cereals** was selected as *a-priori* land use class (an *a-priori* land use class of FAO-Field Test classification system), only cereals may be selected as species. Thus, the land use purpose as defined for the *a-priori* land use class will act as a filter for this field.

Product/Benefit (**>>**)
      The (type of) product harvested from grown species or the benefit obtained from a grown species, or from a rendered service. Only those products and benefits defined in the *a-priori* land use class may be selected here (see above). This field may be defined as "**Unspecified**" by pressing **F6**.

Product Quantity (**-**; **only numbers**)
      Two types of quantities may be specified here:
      •   If the **Product/Benefit** field is defined as "Unspecified", the quantity entered here refers to the species grown or service rendered. Some examples: the area under

rice in a plot; the percentage of a nature reserve that may be used for recreation; or the number of fruit trees in an agroforestry system.

- If a product or benefit is specified in the **Product/Benefit** field, the quantity entered here refers to the product or benefit obtained. An example: the number of kilograms of beans harvested from soy beans plants.

- Unit (>>)

The data unit in which the quantity is expressed, e.g.

- for a species or service: area (under rice) or number (of fruit trees).
- for a product or benefit: weight per area (for harvested product) or weight per area and time.

If the quantity is entered, the unit must always be specified.

- Info Source (>>)

The source from which the information on quantity of species/service or product/benefit is obtained. If this field is shown in the edit screen, and in case a quantity was entered, the information source must be entered.

When you have completed entering or editing information in the **Add/Edit a Land Use Purpose and Quantity** screen, you can exit the screen:

- To save and exit press **F10**.
- To **exit without saving**.press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to the **Add/Edit a Land Use System Description** screen (*Section 6.6.1*). If a new land use purpose was specified, information about an additional land use purpose (and quantity) can be entered, using the same procedure. In this way, many land use purposes may be specified, as shown in the following part of the edit screen:

```
«Add/Edit a Land Use System Description»
A-Priori LU Class    : FAO-Test, Single Cropping of Cereals
 - Species/Service    : Plants, Cereals, ; Amaranthus hybridus L., » -
   Product/Benefit    : Plant Produce, Vegetative parts, Stover / Fodder
   Quantity           :    40.00 -    40.00  ilogram/Ha (kg/ha) (0.0001000000)
 - Species/Service    : Plants, Cereals, ; Dactyloctenium aegyptium Richter
   Product/Benefit    : Flowers/Fruits/Seeds, Grain (Cereals), Milled/Cleaned
   Quantity           : -
 - Species/Service    : Plants, Cereals, Maize / Corn; Zea mays L., » -
   Product/Benefit    : Flowers/Fruits/Seeds, Grain (Cereals), Shelled
   Quantity           :   200.00 -   200.00  Bags of 70 kg (70.0000000000)
 - Species/Service    : *
```

6.6.5   Copy a Land Use System Description

Copying a land use system description, including related data at lower levels, may be time efficient in case a new land use system description is very similar to an existing one. After pressing **F5** in the **Land Use System Descriptions** picklist, an edit screen is displayed:

```
«Copy a Land Use System Description»
 Copy Operat.+Observ.: Yes
 Copy Infrastructure : Yes
 Copy LU Purpose     : Yes
```

Copy Operat.+Observ.
Copy Infrastructure
Copy LU Purposes

Related data on operations, observations, infrastructure and land use purposes that is stored at lower levels of the copied land use system description may also be copied to the new land use system description. Press **Enter** to invoke picklists from which to select **Yes** or **No**.

After entering information in the above fields, start copying by pressing **F10**. The new land use system description will be the highlighted item in the Land Use System Descriptions picklist that is displayed after copying.

6.7   Operations and Observations (Level 4)

"Operations and Observations" is the fourth level for at which to enter collected land use information. Information about individual operations and observations may be entered at this level.

After you selected an item from the Land Use System Descriptions picklist (by pressing **Enter**), the **Operations and Observations** picklist is displayed. This picklist is either empty or contains items summarizing information in stored operations and observations:

- The picklist is empty:

```
«1.  │FAO, ZIMBABWE/91/005 ▶ No:2 ▶ Africa, Zimbabwe, Midlands, Gokwe, Mabalan»
«2.  │No:1  ▶  M1.2 ▶ Site near stream ▶ Each LUS Description is valid for one»
«3.  │No:1 ▶ 21/10/1992 - 15/11/1993 ▶ FAO-Field Test Africa, Single Cropping »
«4.  │Operations and Observations»
«Operations»
«Observations»
                                                                        «▯»
F1=Help Ctrl-Ins=Add Obs.  Ins=Add Oper.
```

No operations or observations were stored for the this land use system description (**No: 1 >> 02/04/1992 - 18/07/1993 >> FAO-Field Test ....**). There are now two options:
- To **add** a new **operation** press **Ins** (*Section 6.7.1*).
- To **add** a new **observation** press **Ctrl-Ins** (*Section 6.7.7*).
- To **exit this picklist** press **Esc**. You will return to the **Land Use System Descriptions** picklist (*Section 6.6*).

- The picklist contains one or more items:

```
«1.  │FAO, ZIMBABWE/91/005 ▶ No:2 ▶ Africa, Zimbabwe, Midlands, Gokwe, Mabalan»
«2.  │No:1  ▶  M1.2 ▶ Site near stream ▶ Each LUS Description is valid for one»
«3.  │No:1 ▶ 21/10/1992 - 15/11/1993 ▶ FAO-Field Test Africa, Single Cropping »
«4.  │Operations and Observations»
«Operations»
01/04/1992 - 01/04/1992   Tillage, Ploughing, Along Contours (or Flat), » -
14/09/1992 - 17/09/1992   Tillage, Ridging
«Observations»
01/10/1992 - 30/10/1992   Growth Limiting Factors, Water Shortage
25/10/1992 - **/11/1992   Infectious Plant Related, Insects/Pests, Stem borers
                                                                        «4»
F1=Help F3=Print F5=Copy Ctrl-Ins=Add Obs. F10=Edit Ins=Add Oper. Del=Delete
```

One or more operations or observations were stored for the current land use system description (**No: 1 >> 02/10/1992 - 15/11/1993 >> FAO-Field Test Africa ...**).

Each item in this picklist refers to stored information about one operation or one observation. Several options are now available:

- To **exit** this picklist press **Esc**. You will return to the **Land Use System Descriptions** picklist (*Section 6.6*).
- To **add** a new **operation** press **Ins** (*Section 6.7.1*).
- To **add** a new **observation** press **Ctrl-Ins** (*Section 6.7.7*).
- To **edit** the highlighted **operation** press **F10** or **Enter** (*Section 6.7.1*).
- To **edit** the highlighted **observation** press **F10** or **Enter** (*Section 6.7.7*).
- To **print** all information of the current dataset press **F3**. All information of the complete dataset to which the operations and observations in the picklist belong, is printed (see example in Appendix 9 and *Section 4.3.2*).
- To **copy** the highlighted **operation** press **F5** (*Section 6.7.9*).
- To **copy** the highlighted **observation** press **F5** (*Section 6.7.10*).
- To **delete** the highlighted **operation** or **observation** press **Del**. All information of this operation or observation is deleted (*Section 4.3.3*).

6.7.1   Add/Edit an Operation

To add a new operation or to edit an existing one, information must be entered or edited in an edit screen. After you pressed **Ins**, **F10** or **Enter** (for a highlighted Operation) in the **Operations and Observations** picklist, the following edit screen appears:

```
┌«Add/Edit an Operation»──────────────────────────────────────┐
│ Operation          : »                                      ↑│
│ Species involved    : »                                      │
│ % of Plot involved  :         –    –          –    [%][Min – Max]│
│ Operation Period    : –          – –          [Start – End Date]│
│ Periodicity         : No                                     │
│ – Description       : –                                      │
│ Operation Duration  :    –       –    –       [Min – Max]    │
│ – Unit              : »                                      │
│ – Info Source       : »                                      │
│ Task Time           :    –       –    –       [Min – Max]    │
│ – Unit              : »                                      │
│ – Info Source       : »                                      │
│ Labour Inputs       : *                                      │
│ Material Inputs     : *                                      │
│ Implements Used      : *                                     │
│ Main Power Source    : »                                     │
│ Products/Benefits   : *                                      │
│ Comments            : –                                     ↓│
└─────────────────────────────────────────────────────────────┘
```

The number of fields in this edit screen depends on the selected data entry filter (*Section 6.2.2*). In the above example, the **Maximum Filter** is used. If you select the **Minimum Filter**, only the following compulsory fields will be shown:

```
┌«Add/Edit an Operation»──────────────────────────────────────┐
│ Operation          : »                                      ↑│
│ – Species involved  :                                        │
│ Labour Inputs       : *                                      │
│ Material Inputs     : *                                      │
│ Main Power Source    : »                                     │
│ Products/Benefits   : *                                     ↓│
└─────────────────────────────────────────────────────────────┘
```

When the **Add/Edit an Operation** screen is displayed, enter the applicable information in the provided fields. Only one field of this edit screen is compulsory: **Operation Name**. All fields of the **Add/Edit an Operation** screen are explained in the **Section 6.7.2**.

When you have completed entering or editing information in the **Add/Edit an Operation** screen, you can exit the screen:

- To save and exit press **F10**.
- To **exit without saving** press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to the **Operations and Observations** picklist (*Section 6.7*).

6.7.2   Fields of Operation

The meaning and usage of all fields of the **Add/Edit an Operation** screen are briefly explained below, in the sequence as they appear in the edit screen.

The type of field (as put between parenthesis) determines what type of information can be entered in the field: (**>>**) an item from a picklist; (**-**) numbers or text; and (*****) another edit screen is invoked. For **>>** fields in which items are selected from glossary trees, the number of possible selections may be limited when glossary items are pre-selected in the data entry filter (*Section 5.3*).

Operation Name (**>>**)
> The name of the operation carried out. It may be a general description, e.g. "tillage", or a very detailed one, e.g. "light ploughing <15 cm deep, along contours".

Species involved (**>>**)
> The species involved in the operation, e.g. the species of which a product is harvested. Only the species that were defined in the land use purpose classifiers of the selected *a-priori* land use class (*Section 6.6*) may be selected. For example, when maize and sugarcane is grown, you can specify the planting of maize or the spraying of cane. This field may also be defined as "**Unspecified**" (by pressing **F6**) when the operation is crop a-specific. If only one species was specified for the land use class, this field cannot be used.

% of Plot involved (**-**; **only numbers**)
> The percentage of the plot that was involved in the operation, e.g. only half of a plot was ploughed. If this percentage cannot be specified accurately, enter a (estimated) range: first enter the minimum percentage and subsequently the maximum. If the percentage is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum percentage.

Operation Period (**-**; **only numbers**)
> The date or period during which the operation was carried out. For example, ploughing on the 23 and 24 of May 1994 is entered as **23/5/1994 - 24/05/1994**. If the operation was carried out at one day, enter the same date twice. Dates may be entered in two ways (according to the Gregorian calendar or as a relative date). See further explanation under the field **Op. Seq. Period** of the **Add/Edit a Land Use System Description** screen (*Section 6.6.2*). For the specification of qualitative periods such as 'the first week of April', see Appendix 7.

Periodicity (**>>**)

The operation may be carried out repeatedly during the specified period. For example, if cows graze on a piece of grassland one day per week, it is not possible to describe the operation for each week. If the operation is carried out repeatedly, you may opt to enter it only once. A description of the periodicity should then be entered in the next field.

- Description (**-**)

A description of the periodicity of the operation, e.g. "once per week", "three times each month" or "after each rain".

Operation Duration (**-**; **only numbers**)

The time required to actually carry out the operation. This must not be confused with the operation period, which indicates only the start and end date of the period during which the operation was carried out. For example, if ploughing was carried out on 23 and 24 May 1994, then the operation period is **23/5/1994 - 24/5/1994** but the operation duration may have been 2 days * 7 hours = 14 hours. If the operation duration cannot be specified accurately, enter a (estimated) range: first enter the minimum and subsequently the maximum. If the duration is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum duration.

- Unit (**>>**)

The data unit in which the operation duration is expressed, usually a unit of time. If the duration is entered, the unit must always be specified.

- Info Source (**>>**)

The source from which the information on the operation duration is obtained. If this field is shown in the edit screen, and in case a operation duration was entered, the information source must be entered.

Task Time (-; only numbers)

The total labour time spent by labourers to carry out this operation. The task time must not be confused with the operation duration. For example, if the operation duration of ploughing was 14 hours and if three persons were conducting this operation, the task time was 3 * 14 = 42 hours. The task time can be specified per labourer in the **Add/Edit a Labour Input** screen (*Section 6.7.3*). If the task time cannot be specified accurately, enter a (estimated) range: first enter the minimum and subsequently the maximum. If the task time is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum task time.

- Unit (**>>**)

The data unit in which the task time is expressed, usually a unit of time, e.g. hours or mandays. If the time is entered, the unit must always be specified.

- Info Source (**>>**)

The source from which the information on task time is obtained. If this field is shown in the edit screen, and in case a task time was entered, the information source must be entered.

Labour Inputs (*****)

Information on the labour inputs used to carry out this operation is entered in the **Add/Edit a Labour Input** screen (*Section 6.7.3*).

Material Inputs (*)

> Information on the material inputs used during this operation is entered in the **Add/Edit a Material Input** screen (*Section 6.7.4*).

Implements Used (*)

> Information on the implements used during this operation is entered in the **Add/Edit an Implement Used** screen (*Section 6.7.5*).

Main Power Source (>>)

> The major type of power source that was used to carry out the operation, e.g. human power, animal traction, or machine power. Note that human power is needed for almost all operations, but in case a tractor is used, the main power source is machine power. Note also that information on the type of tractor used should be entered in the **Implements Used** field.

Products/Benefits (*)

> Information on the product harvested or benefit obtained as a result of this operation is entered in the **Add/Edit a Product/Benefit Obtained** screen (*Section 6.7.6*).

Comments (-)

> Additional information about this operation. The comments are entered in a free text window (*Section 4.2.5*). They should be applicable for the information entered in this edit screen, e.g. additional information on the success of the operation or possible problems encountered. No additional information should be given on the value in a **>>** field, since such information belongs in the glossary, i.e. either in existing glossary items or in glossary items yet to be defined.

6.7.3   Add/Edit a Labour Input

After pressing **Enter** at the **Labour Input** field in the **Add/Edit an Operation** screen, a new edit screen is invoked in which to enter information on the type and quantity of one labour input.

```
┌«Add/Edit a Labour Input»─────────────────────────────┐
│ Gender & Age Class   : »                              │
│ Skill                : »                              │
│ No. of Persons       :   –     –     –      [Min – Max]│
│ – Info Source        : »                              │
│ Task Time            :   –     –     –      [Min – Max]│
│ – Unit               : »                              │
│ – Info Source        : »                              │
│ Labour Origin        : »                              │
└──────────────────────────────────────────────────────┘
```

The number of fields in this edit screen depends on the selected data entry filter (*Section 6.2.2*). In the above example the **Maximum Filter** was selected.

When the edit screen is displayed, enter the applicable information in the provided fields. One field of this edit screen is compulsory: **Gender & Age Class**. Note that the combination of gender & age class, skill and labour origin must be unique for the current operation.

Gender & Age Class (>>)

> The gender and age of the labourer(s), e.g. a male adult (16-59 years).

Skill (>>)

> The skill of the labourer(s), e.g. experienced.

No. of Persons (**-**; **only numbers**)

The number of persons of the specified gender, age and skill class providing the labour input. If the number of persons cannot be specified accurately, enter a (estimated) range: first enter the minimum and subsequently the maximum number. If the number is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum number.

- Info Source (**>>**)

The source from which the information on the number of persons was obtained. If this field is shown in the edit screen, and in case a number was \entered, the information source must be entered.

Task Time (**-**; **only numbers**)

The total labour time spent by the persons of the specified gender, age and skill class to carry out the operation. If the task time cannot be specified accurately, enter a (estimated) range: first enter the minimum task time and subsequently the maximum. If the task time is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum task time.

- Unit (**>>**)

The data unit in which the task time is expressed, usually a unit of time. If the task time is entered, the unit must always be specified.

- Info Source (**>>**)

The source from which the information on labour input quantity was obtained. If this field is shown in the edit screen, and in case a task time was entered, the information source must be entered.

Labour Origin (**>>**)

The origin of the labourers who provided the labour input, e.g. contract labourer or relatives.

When you have completed entering or editing information in the **Add/Edit a Labour Input** screen, you can exit the screen:
- To **save and exit** press **F10**.
- To **exit without saving** press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to the **Add/Edit an Operation** screen (*Section 6.7.1*). If a new labour input was specified, information about an additional labour input can be entered, using the same procedure. In this way, many labour inputs may be specified, as shown in the following part of the edit screen:
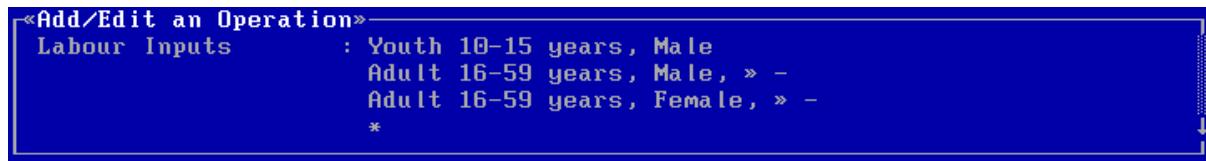
```
«Add/Edit an Operation»
  Labour Inputs      : Youth 10-15 years, Male
                       Adult 16-59 years, Male, » -
                       Adult 16-59 years, Female, » -
                       *
```

6.7.4   Add/Edit a Material Input

After pressing **Enter** at the **Material Inputs** field in the **Add/Edit an Operation** screen, a new edit screen is invoked in which to enter information on the type and quantity of the material input.

```
┌«Add/Edit a Material Input»────────────────────────────────┐
│ Material Input        : »                                 │
│ Species/Service       : »                                 │
│ Quality Class         : »                                 │
│ Quantity              :    –        –    –        [Min – Max]│
│ – Unit                : »                                 │
│ – Info Source         : »                                 │
│ Input Origin          :    –        –    –        [Min – Max]│
│                                                           │
└───────────────────────────────────────────────────────────┘
```

The number of fields in this edit screen depend on the data entry filter, as selected in the settings screen (*Section 6.2.2*). In the above example the **Maximum Filter** was selected.

When the edit screen is displayed, enter or edit applicable information in the provided fields. One field of this edit screen is compulsory: **Material Input**.

Material Input (**>>**)
> The (type of) material applied. Material Inputs must cannot be recovered from the land use system after their usage. Some examples: seeds, fertilizers, animal feed and pesticides.

Species/Service (**>>**)
> The species of which the material input was derived, e.g. if the material input is seeds, the species of the seeds can be specified, or if organic manure of animal origin is used, you can specify which species produced the dung. The link between material input and species/service can be specified for glossary items from the Material Inputs glossary tree (*Section 5.2.9*).

Quality Class (**>>**)
> The quality of the material input used.

Quantity (**-**; **only numbers**)
> The quantity of the specified material input, used for this operation. If this quantity cannot be specified accurately, enter a (estimated) range: first enter the minimum and subsequently the maximum quantity. If the quantity is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum quantity.

- Unit (**>>**)
> The data unit in which the quantity of the material input is expressed, e.g. weight, number. If the quantity is entered, the unit must always be specified.

- Info Source (**>>**)
> The source from which the information on material inputs quantity was obtained. If this field is shown in the edit screen, and in case a quantity was entered, the information source must be entered.

Input Origin (**>>**)
> The location from where the material input, used for this operation, was derived, e.g. from outside the holding.

When you have completed entering or editing information in the **Add/Edit a Material Input** screen, you can exit the screen:

- To **save and exit** press **F10**.
- To **exit without saving** press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to the **Add/Edit an Operation** screen (*Section 6.7.1*). If a new material input was specified, information about an additional material input can be entered, using the same procedure. In this way, many material inputs may be specified, as shown in the following screen:

```
┌«Add/Edit an Operation»─────────────────────────────────────────────────
│ Material Inputs       : Planting Materials, Seed
│                         N Products (No P,K,S,Mg), Urea (46), » -
│                         Biocides, Herbicides, » -
│                         *
│
```

6.7.5   Add/Edit an Implement

After pressing **Enter** at the **Implement Used** field in the **Add/Edit an Operation** screen, or the **Add/Edit an Observation** screen, a new edit screen is invoked in which to enter information on the type and quantity of one implement used for this operation or observation.

```
┌«Add/Edit an Implement»────────────────────────────────────────────────
│ Implement             : »
│ - Species             : »
│ Quality Class         : »
│ Number used           :   -         -  -          [Min - Max]
│ - Info Source         : »
│ Implement Origin      : »
│
```

The number of fields in this edit screen depends on the selected data entry filter (*Section 6.2.2*). In the above example the **Maximum Filter** was selected.

When the edit screen is displayed, enter or edit applicable information in the provided fields. One field of this edit screen is compulsory: **Implement**.

Implement (**>>**)

A description of the implement used for this operation/observation, e.g. a hoe or animal (used as a power source).

- Species (**>>**)

The species origin of the used implement. If the implement is an animal, the animal type can be specified, e.g. cattle > 2 years. The link between implements and species/service can be specified for glossary items from the **Implements** glossary tree (*Section 5.2.9*).

Quality Class (**>>**)

The quality of the implement used.

Number Used (**-**; **only numbers**)

The total number used of the specified implement. If the number cannot be specified accurately, enter a (estimated) range: first enter the minimum and subsequently the

maximum number. If the number is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum number.

- Info Source (**>>**)
The source from which the number used of this implement was obtained. If this field is shown in the edit screen, and in case a number was entered, the information source must be entered.

Implement Origin (**>>**)
The location from where the implement was derived, e.g. from outside the holding.

When you have completed entering or editing information in the **Add/Edit an Implement** screen, you can exit the screen:
- To **save and exit** press **F10**.
- To **exit without saving** press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to the **Add/Edit an Operation** screen (*Section 6.7.1*). If a new implement was specified, information about an additional implement can be entered, using the same procedure. In this way, many implements may be specified, as shown in the following screen:

```
┌«Add/Edit an Operation»──────────────────────────────────────────────┐
│ Implements Used       : Human Powered (Hand tools), for Tillage, Hoe │
│                         Animals used as Power Source: Animals, Cattle, » ─ │
│                         *                                             │
│                                                                      │
└──────────────────────────────────────────────────────────────────────┘
```

6.7.6   Add/Edit a Product/Benefit Obtained

After pressing **Enter** at the **Products/Benefits** field in the **Add/Edit an Operation** screen, a new edit screen is invoked in which to enter information on one product/benefit obtained through the current operation.
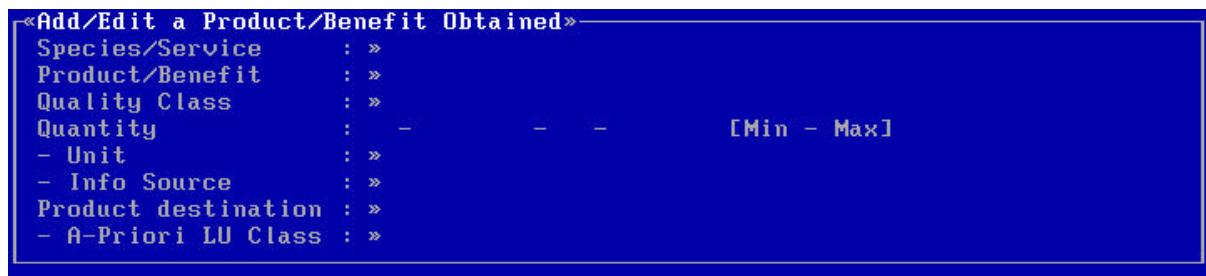
```
┌«Add/Edit a Product/Benefit Obtained»──────────────────────────────┐
│ Species/Service      : »                                          │
│ Product/Benefit      : »                                          │
│ Quality Class        : »                                          │
│ Quantity             :   ─         ─   ─         [Min ─ Max]       │
│ ─ Unit               : »                                          │
│ ─ Info Source        : »                                          │
│ Product destination  : »                                          │
│ ─ A-Priori LU Class  : »                                          │
└────────────────────────────────────────────────────────────────────┘
```

The number of fields in this edit screen depends on the selected data entry filter (*Section 6.2.2*). In the above example the **Maximum Filter** was selected.

When the edit screen is displayed, enter or edit applicable information in the provided fields (for general information on using edit screens see Section 4.2.4). Two fields of this edit screen are compulsory: Species/Service and Product/Benefit.

Enter or edit collected data in the applicable fields of the edit screen. The **Species/Service** and **Product/Benefit** fields must always be filled.

Species/Service (**>>**)
Product/Benefit (**>>**)

A [Species/Service-Product/Benefit] combination as already specified for the current land use system description (Level 3), i.e. in the **Add/Edit a Land Use Purpose** screen (*Section 6.6.4*).

Quality Class (**>>**)

The quality of the product/benefit obtained.

Quantity (-; **only numbers**)

The quantity of the specified product or benefit, obtained from this operation. If this quantity cannot be specified accurately, enter a (estimated) range: first enter the minimum and subsequently the maximum quantity. If the quantity is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum quantity.

- Unit (**>>**)

The data unit in which the quantity of the product or benefit is expressed, e.g. a number or quantity. If the size is entered, the unit must always be specified.

- Info Source (**>>**)

The source from which the information on product/benefit quantity was obtained. If this field is shown in the edit screen, and in case a quantity was entered, the information source must be entered.

Product Destination (**>>**)

The destination of the obtained product, e.g. sold to a cooperative or for own consumption.

- A-Priori LU Class (**>>**)

The obtained product or benefit can be used as an input in another land use system. the class name of this second system is here required. Any defined *a-priori* land use class can be specified in this field. For example, the straw of wheat may be used as mulch between vegetables.

When you have completed entering or editing information in the **Add/Edit a Product/Benefit Obtained** screen, you can exit the screen:

- To **save and exit** press **F10**.
- To **exit without saving** press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to the **Add/Edit an Operation** screen (*Section 6.7.1*). If a new product/benefit obtained was specified, information about an additional product/benefit can be entered, using the same procedure. In this way, many products/benefits may be specified, as shown in the following screen:

```
┌«Add/Edit an Operation»──────────────────────────────────────────┐
│ Products/Benefits     : Plant Produce, Vegetative parts, Stover / Fodder │
│                         Flowers/Fruits/Seeds, Grain (Cereals), Milled/Cleaned │
│                         *                                        │
│                                                                  │
└──────────────────────────────────────────────────────────────────┘
```

6.7.7 Add/Edit an Observation

To add a new observation or edit an exiting one, information must be entered or edited in an edit screen. After you pressed **Ctrl-Ins**, **F10** or **Enter** (for a highlighted Observation) in the **Operations and Observations** picklist, the following edit screen appears:

```
┌«Add/Edit an Observation»──────────────────────────────────────────────────────┐
│ Observation          : »                                                      ↑│
│ Species involved     :                                                         │
│ Sample-ID            :                                                         │
│ Observation Period   : -          - -            [Start - End Date]            │
│ Relocated Material   : » -                                                     │
│ - Origin/Destination : »                                                       │
│ Observed Quantity    : -          -   -          [Min - Max]                   │
│ - Unit               : »                                                       │
│ - Info Source        : »                                                       │
│ Implements Used      : *                                                       │
│ Production Increase  :          -   -         -  [%][Min - Max]                │
│ - Info Source        : »                                                       │
│ Comments             : -                                                       ↓│
└────────────────────────────────────────────────────────────────────────────────┘
```

The number of fields in this edit screen depends on the selected data entry filter (*Section 6.2*). In the above example, the **Maximum Filter** is used. If you select the **Minimum Filter**, only the following two fields will be shown:

```
┌«Edit an Observation»──────────────────────────────────────────────────────────┐
│ Observation          : »                                                       │
│ - Species involved   :                                                         │
└────────────────────────────────────────────────────────────────────────────────┘
```

When the edit screen is displayed, enter or edit applicable information in the provided fields. One field of this edit screen is compulsory: **Observation Name**. All fields of **Add/Edit an Operation** screen are explained in *Section 6.7.8*.

When you have completed entering or editing information in the **Add/Edit an Observation** screen, you can exit the screen:
- To **save and exit** press **F10**.
- To **exit without saving** press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to the **Operations and Observations** picklist (*Section 6.7*).

6.7.8 Fields of Observation

The meaning and usage of all fields of the **Add/Edit an Observation** screen are briefly explained below, in the sequence as they appear in the edit screen.

The type of field (as put between parenthesis) determines what type of information can be entered in the field: (**>>**) an item from a picklist; (**-**) numbers or text; and (*****) another edit screen is invoked. For **>>** fields in which items are selected from glossary trees, the number of possible selections may be limited when glossary items are pre-selected in the data entry filter (*Section 5.3*).

127

The Land Use Database

Observation Name (>>)

The name of the observation made, e.g. "poor germination", "fire effects", "oxygen deficiencies in soil", "crop height".

Species involded (>>)

The species involved in the observation. Any species occurring in the glossary may be selected; alternatively, if the observation is crop a-specific the field may be defined as "**Unspecified**" (by pressing **F6**).

Sample-ID (-)

The unique identifier of a sample taken during the observation, e.g. a sample of yellow or red leaves of a normally green crop.

Observation Period (-; only numbers)

The date or period during which the observation was made. The start date of the period is entered in the left field, the end date in the right. If the observation is valid for one day, enter the same date twice. The dates may be entered in two ways (according to the Gregorian calendar or as a relative data). See also explanation of field **Start/End Date** of the **Add/Edit a Land Use System Description** screen in *Section 6.6.2*. For the specification of qualitative periods such as 'the first week of April', see Appendix 7.

Relocated Material (>>)

The material that left or entered the plot through environmental forces (not through an operation), e.g. soil (through erosion).

- Origin/Destination (>>)

The origin or destination of the material that was relocated.

Observed Quantity (-; only numbers)

The quantity of the relocated product. If this quantity cannot be specified accurately, enter a (estimated) range: first enter the minimum and subsequently the maximum quantity. If the quantity is exactly known, enter the same value for minimum and maximum, i.e. accept the default value for the maximum quantity.

- Unit (>>)

The data unit in which the observed quantity of relocated material is expressed, e.g. kilograms per hectare (for soil loss). If the quantity is entered, the unit must always be specified.

- Info Source (>>)

The source from which the information on observed quantity of relocated material was obtained. If this field is shown in the edit screen, and in case a quantity was entered, the information source must be entered.

Implements Used (*)

Information on the implements used in order to carry out this observation is entered in the **Add/Edit an Implement Used** screen (*Section 6.7.5*).

Production increase (-; only numbers)

The estimated impact of the observed situation on the production. There may be an increase or a decrease in production; to be described by respectively positive or negative values. The entered value is a percentage of the expected production without this impact. If this production increase cannot be specified accurately, enter a (estimated) range: first enter the minimum and subsequently the maximum percentage.

If the increase is known exactly, enter the same value for minimum and maximum, i.e. accept the default value for the maximum percentage.

- Info Source (>>)
   The source from which the information on production increase was obtained. If this field is shown in the edit screen, and in case an increase was entered, the information source must be entered.

Comments (-)
   Additional information about this observation. The notes are entered in a free text window (*Section 4.2.5*). They should be applicable for the information entered in this edit screen, e.g. additional information on the value of this observation, or possible problems encountered. No additional information should be given on the value in a **>>** field, since such information belongs in the glossary, i.e. either in existing glossary items or in glossary items yet to be defined.

<div style="background:#f5f5dc">

6.7.9   Copy an Operation

</div>

Copying an operation, including related data at lower levels, may be time efficient in case a new operation is very similar to an existing one. After pressing **F5** in the **Operations and Observations** picklist, an edit screen is displayed:

```
┌«Copy an Operation»─────────────────────────────────────────────┐
│ From:                                                          │
│ Operation Name      : Tillage, Ploughing, Along Contours (or Flat), » - │
│ Species involved    : »                                        │
│ Operation Period    : -        -  -        [Start - End Date]   │
│ To:                                                            │
│ Operation Name      : »                                        │
│ Species involved    : » -                                      │
│ Operation Period    : -        -  -        [Start - End Date]   │
│ Copy Implements     : Yes                                      │
│ Copy Material Inputs: Yes                                      │
│ Copy Labour Inputs  : Yes                                      │
│ Copy Product/Benefit: Yes                                      │
└────────────────────────────────────────────────────────────────┘
```

To: Operation Name
    Species involved
    Operation Period
    Enter the operation name, species involved and operation period of the new operation (*Section 6.7.2*).

Copy Implements Used
Copy Material Inputs
Copy Labour Inputs
Copy Products/Benefits
    Related data on implements used material inputs, labour inputs and products/benefits obtained that is stored at lower levels of the copied operation may also be copied to the new operation by pressing **Enter**. Picklists are invoked from which to select **Yes** or **No**.

After entering information in the above fields, start copying by pressing **F10**. The new operation will be the highlighted item in the **Operations and Observations** picklist that is displayed after copying.

6.7.10   Copy an Observation

Copying an observation, including related data at lower levels, may be time efficient in case a new operation is very similar to an existing one. After pressing **F5** in the **Operations and Observations** picklist, an edit screen is displayed:

```
┌«Copy an Observation»─────────────────────────────────────────────┐
│ From:                                                             │
│ Observation Name    : Tillage, Ploughing, Along Contours (or Flat), » ─│
│ Species involved    : Cereals, Maize / Corn                       │
│ Observation Period  : 01/03/1993-31/03/1993  [Start - End Date]   │
│ To:                                                               │
│ Observation Name    : »                                           │
│ Species involved    : » ─                                         │
│ Observation Period  : ─       ─ ─            [Start - End Date]    │
│ Copy Implements Used: Yes                                         │
└───────────────────────────────────────────────────────────────────┘
```

To: Observation Name
Species involved
Operation Period
Enter the operation name, species involved and operation period of the new operation (*Section 6.7.2*).

Copy Implements Used
Related data on implements used that is stored at lower levels of the copied observation may also be copied to the new observation by pressing **Enter** . Picklists are invoked from which to select **Yes** or **No**.

After entering information in the above fields, start copying press **F10**. The new observation will be the highlighted item in the **Operations and Observations** picklist that is displayed after copying.

6.8   Land Use Classes

In The Land Use Database, an *a-priori* land use class name must be linked to each land use system description. Accordingly, the required *a-priori* land use classes must be defined before the collected land use data can be entered.

Any number of *a-priori* land use classes may be defined, grouped together in a hierarchical land use classification system. Presently, in The Land Use Database 240 different land use classification systems can be specified. For general information on how to define land use classes and how to structure general classes into a classification system, see *Sections 2.3.2* and *2.3.3*.

Note that *posteriori* classification routines of data stored in The Land Use Database are not provided. Data analysis must be carried out using other softwares after exporting stored land use information (by a query, see *Chapter 7*).

With the **Land Use Classes** option, you can define new *a-priori* land use classes and land use classification systems and edit existing ones. It is possible to develop any classification system by you, or to use an existing one.   It is recommended to adopt generally accepted classification systems, or base a newly developed classification system on your study objectives. An example print of part of a classification system is included in Appendix 10.

6.8.1   A-Priori Land Use Classification Systems

Land use classes are often organized in a land use classification system that is hierarchically structured. After you selected Land Use Classes from the main menu of the Data Entry Module, the **A-Priori Land Use Classification Systems** picklist appears.
This may either be empty or contain items:

- The picklist is empty:

```
┌«A-Priori Land Use Classification Systems»───────────────────────┐
│                                                            «0»  │
│F1=Help  Ins=Add                                                 │
```
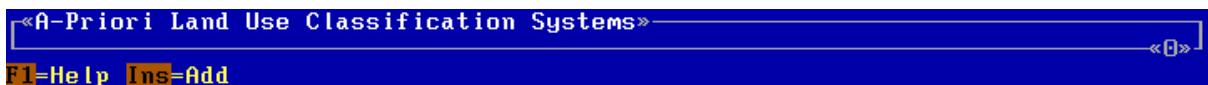
  No land use classification systems, and therefore no land use classes, are stored in The Land Use Database. There are two options:
  - To **add** an *a-priori* classification system press **Ins** (*Section 6.8.2*)
  - To **exit** this picklist press **Esc**. You will return to the main menu of the Data Entry Module (*Section 6.1*).

- The picklist contains one or more items:

```
┌«A-Priori Land Use Classification Systems»───────────────────────┐
│   5   FAO-Field Test 11/93-1/94; Africa                    0 »  │
│   15  Test Classification System                           0 »  │
│                                                           «2»   │
│F1=Help  F3=Print  F4=Search  F10=Edit  Ins=Add  Del=Delete  Enter=Select │
```

  One ore more land use classification systems are currently stored. The items in the picklist show the code and name of each stored land use classification system. Several options are now available:
  - To **select** the highlighted classification system and **go to** the first picklist with land use classes press **Enter** (*Section 6.8.3*).
  - To **exit this picklist**: press **Esc**. You will return to the main menu of the Data Entry Module (*Section 6.1*).
  - To **add** a new *a-priori* classification system press **Ins** (*Section 6.8.2*).
  - To **edit** the name of the highlighted *a-priori* classification system press **F10** (*Section 6.8.2*).
  - To **search** for names of land use classes or classification systems press **F4** (*Section 4.3.4*).
  - To **print** all *a-priori* land use classes of one or more classification systems press **F3** (*Section 6.8.5*).
  - To **delete** the highlighted *a-priori* classification system press **Del** (*Section 6.8.6*).

6.8.2   Add/Edit an A-Priori Land Use Classification System

To add a new land use classification system or edit the code or name of an existing one information must be entered in an edit screen. After you pressed **Ins** or **F10** in the **A-Priori Land Use Classification Systems** picklist, the following edit screen appears:

```
┌«Add/Edit an A-Priori Land Use Classification System»────────────┐
│  Code              :   0                                         │
│  Name              :                                             │
```
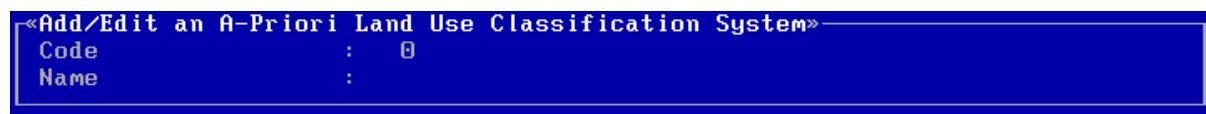
Code

The unique code for this classification system (1-240). The code cannot be changed if one or more land use classes within the classification system are used to specify stored land use data. In that case the message (**Item is Used**) will be displayed right of the code.

Name

The name of the *a-priori* classification system, e.g. the project name if the classification system is specific for one project, or the country name if it is specific for a country.

After you have completed entering or editing information, you can save the edit screen: press **F10**. You will return to the **Land Use Classification Systems** picklist (*Section 6.8.1*).

6.8.3   A-Priori Land Use Classes

After you selected a classification system from the **A-Priori Land Use Classification Systems** picklist (by pressing **Enter**), or you selected an *a-priori* land use class from within the current *a-priori* land use classification system, the picklist at the next level may either be empty or contain items:

- The picklist is empty:

```
«A-Priori Land Use Classification Systems»
  «Test Classification System»
                                                      «0»
                                                      «2»
F1=Help  Ins=Add
```
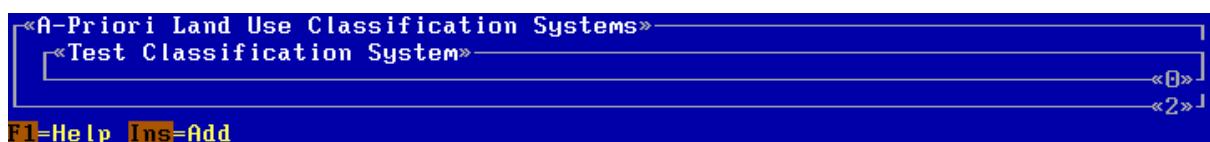
No land use classes are stored for this classification system, or no "sub-classes" are defined for the selected land use class. There are two options:
- To **add** an *a-priori* land use class press **Ins**> (*Section 6.8.4*).
- To **exit** this picklist press **Esc**. You will return to the **A-Priori Land Use Classification Systems** picklist (*Section 6.8.1*), or a picklist with *a-priori* land use classes at a higher level within the current classification system (as above or below).

- The picklist contains one or more items:

```
«A-Priori Land Use Classification Systems»
  «FAO-Field Test 11/93-1/94; Africa»
    5   Single Cropping                               76
    10  Sequential Cropping                            3
    15  Intercropping                                  9
                                                      «3»
F1=Help  F3=Print  F4=Search  F10=Edit  Ins=Add  Del=Delete  Enter=Select
```

One ore more land use classes are stored for the selected classification system or land use class. The items in the picklist show the code and name of each stored *a-priori* land use class. Several options are now available:
- To **select** the highlighted land use class and **go to** the next level of land use classes press **Enter**. A picklist with more detailed *a-priori* land use classes appears, which may either be empty or contain items (see above).
- To **exit this picklist** press **Esc**. You will return to the **A-Priori Land Use Classification Systems** picklist (*Section 6.8.1*), or a picklist with *a-priori* land use classes at a higher level within the current classification system (as above or below).

- To **add** a new *a-priori* land use class press **Ins** (*Section 6.8.4*).
- To **edit** the highlighted *a-priori* land use class press **F10** (*Section 6.8.4*).
- To **search** for names of land use classes or classification systems press **F4** (*Section 4.3.4*).
- To **print** one or more *a-priori* land use classes and information on classes at lower levels press **F3** (*Section 6.8.5*).
- To **delete** the highlighted *a-priori* land use class press **Del** (*Section 6.8.6*).

6.8.4   Add/Edit an A-Priori Land Use Class

Land use classes are defined by certain criteria, called classifiers. Three types of classifiers are used to define a-priori classes in The Land Use Database: Purpose classifiers, Operation Sequence classifiers and Context classifiers (*Section 2.3.2*).

To add a new *a-priori* land use class or edit an existing one, information must be entered in an edit screen. After you pressed **Ins** or **F10** in a picklist containing *a-priori* land use classes, the following edit screen appears.

```
┌«Add/Edit an A-Priori Land Use Class»────────────────────────────┐
│ Code                 :   0                                      ↑│
│ A-Priori LU Class    :                                          ░│
│ ─Land Use Purpose Classifiers───────────────────────────────── ░│
│ - Species/Service    : »                                       ░│
│   Product/Benefit    : »                                       ░│
│ - Species/Service    : »                                       ░│
│   Product/Benefit    : »                                       ░│
│ ─Operation Sequence Classifiers─────────────────────────────── ░│
│ - 1:   Crop Production, » -                                    ░│
│ - 2:   Livestock Production, » -                              ░│
│ ...etc ...                                                     ░│
│ ─Context Classifiers─────────────────────────────────────────  ░│
│ - 1:   Tenancy Arrangement, » -                              ░│
│ - 2:   Market Orientation, » -                               ░│
│ - 3:   Capital Intensity, » -                                ░│
│ - 4:   Infrastructure Requirements, » -                      ░│
│ ...etc ...                                                     ↓│
└──────────────────────────────────────────────────────────────────┘
```

The number of fields in this edit screen depends on the selected data entry filter (*Section 6.2.2*). In the above example, the **Maximum Filter** is used. If you select the **Minimum Filter**, only the following compulsory fields will be shown:

```
┌«Add/Edit an A-Priori Land Use Class»────────────────────────────┐
│ Code                 :   0                                      │
│ A-Priori LU Class    :                                          │
│ ─Land Use Purpose Classifiers───────────────────────────────── │
│ - Species/Service    : »                                       │
│   Product/Benefit    : »                                       │
│ - Species/Service    : »                                       │
│   Product/Benefit    : »                                       │
└──────────────────────────────────────────────────────────────────┘
```

Enter the information to define the *a-priori* land use class in the applicable fields of the edit screen. Four fields of the **Add/Edit an A-Priori Land Use Class** screen must always be specified: **Code**, **Name**, **Species/Service** and **Product/Benefit**.

133

Code

The code of the land use class (1-240). The code must be unique for this level of land use classes. For existing land use classes, it may only be changed if the class is not used to specify stored land use data.

Name

The name of the land use class. The name must be a good description of the class, e.g. **Single Cropping of Cereals**. Also, the name must be unique for this level of land use classes.

Land Use Purpose Classifiers

A purpose classifier is entered into two fields, i.e. as a [Species/Service-Product/Benefit] combination. The combination of these two fields acts as a classifier. Each land use class must at least be defined by one purpose classifier. More than one purpose classifier can be specified for multi-purpose land use classes.

- Species/Service

The species or service from which the product or benefit of the classified land use is obtained. It may be general, e.g. "cereals", or detailed, e.g. "cereals - Amaranthus hybridus L. ssp. incurvatus ...", but it is recommended to keep the description as general as required.

The species/service entered here acts as a filter for the **Species/Service** field in the **Add/Edit a Land Use Purpose and Quantity** screen (*Section 6.6.4*). For example, if "Cereals" is entered in this field, only cereals can be selected as species/service in the **Add/Edit a Land Use Purpose and Quantity** screen. Similarly, when more levels of land use classes are defined, the species/service of a land use class at a higher level acts as a filter for species/service specification at the lower level.

- Product/Benefit

The product harvested or the benefit obtained from the classified land use. This may also be general, e.g. "plant produce", or very detailed, e.g. "old mature leaves". The product/benefit entered here also acts as a filter for the **Product/Benefit** field in the **Add/Edit a Land Use Purpose and Quantity** screen (*Section 6.6.4*). For example, if "plant produce" is entered in this field, only plant produces can be selected as product/benefit in the **Add/Edit a Land Use Purpose and Quantity** screen. Similarly, when more levels of land use classes are defined, the product/benefit of a land use class at a higher level acts as a filter for product/benefit specification at the lower level.

Operation Sequence Classifiers

A number of parameters related to the operation sequence and to individual operations is shown in the next fields. These correspond to the second level of the glossary tree "Classifiers: Oper.Sequence". By adding items to the second level of this glossary tree, you can add parameters to the list of context classifiers in this screen (*Section 5.2.6*). When more levels of land use classes are defined, the operation sequence classifiers at a higher level act as a filter for the classifiers of related classes at lower levels. To select a value for the highlighted classifier press **Enter**. A picklist appears. There are to possibilities:

- To **select** an item. Selection implies that this classifier is used to define the land use class. For example, if you select "Yes" for the classifier "Crop Production", only land use systems with crop production may belong to this land use class. If you select

"No" for this classifier, it implies that only land use systems without crop production may belong to this land use class. Highlight an item and press **Enter**.

- **Not to select** an item. This implies that this classifier is not used for the definition of the land use class. This is the default value for all operation sequence classifiers. So, if you want to use just one operation sequence classifier to define a land use class, you only have to "**specify**" this classifier by pressing **F6**.

Context Classifiers

A number of parameters related to the context of land use and to individual operations is shown in the next fields. Three types of context classifiers can be distinguished:

- The origin of material inputs and implements used for operations.
- The tenancy arrangement.
- Other parameters of which information cannot be stored in The Land Use Database. For example: capital intensity, holder's attitude, goals of the holder.

These correspond to the second level of the glossary tree "Classifiers: Context". By adding items to the second level of this glossary tree, you can add parameters to the list of context classifiers in this screen (*Section 5.2.6*). When more levels of land use classes are defined, the context classifiers at a higher level act as a filter for the classifiers of related classes at lower levels. Follow the above instructions for **Operation Sequence Classifiers**.

After you have completed entering or editing information in the edit screen, exit the screen:

- To save and exit press **F10**.
- To **exit without saving** press **Esc**. A **Yes/No** picklist will appear from which to select if the changes made in the edit screen can indeed be abandoned.

In both cases you will return to a picklist with *a-priori* land use classes (*Section 6.8.3*).

6.8.5   Print A-Priori Land Use Classes

You can print information about individual or sets of *a-priori* land use classes as well as about complete classification systems. After pressing **F3** in a picklist with land use classes or land use classification systems, a picklist appears from which to select what information must be printed:
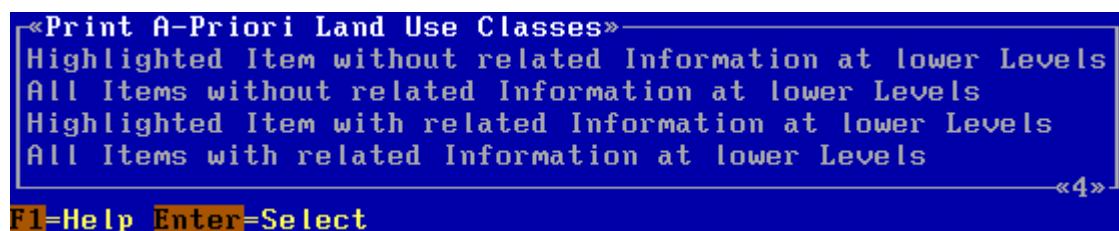
```
«Print A-Priori Land Use Classes»
Highlighted Item without related Information at lower Levels
All Items without related Information at lower Levels
Highlighted Item with related Information at lower Levels
All Items with related Information at lower Levels
                                                   «4»
F1=Help Enter=Select
```

Highlighted Item without related Information at lower Levels
Print information about the highlighted item only.

All Items without related Information at lower Levels
Print information about all items in the current picklist.

Highlighted Item with related Information at lower Levels
Print information about the highlighted item plus all related items at lower levels.

All Items with related Information at lower Levels
Print information about all items in the current picklist plus all related items lower levels.

After selection of one of the above options, a picklist is displayed in which to select if only names must be included in the output:

```
«Names Only?»
Yes
No
              «2»
```

Yes

Only the code and the name of all selected land use classes is printed. Information on classifiers is not printed.

No

The code, name and classifiers of all selected land use classes are printed.

After selecting **Yes** or **No**, a new picklist appears in which to select the output device for the printed output. An example print of part of an *a-priori* land use classification system is included in Appendix 10.

6.8.6   Delete an A-Priori Land Use Class or Classification System

A-priori land use classes and complete classification systems may be deleted, if required. After highlighting the item to be deleted and pressing **Del** when in a picklist with land use classes or classification systems, there are two possibilities:

- A message appears:

```
This Item or a related Item at a lower Level is Used
Deletion is not allowed
                                          «Press <Enter>»
```

  The highlighted item (a class or classification system), or a related item at lower level is used to specify one or more land use system descriptions.   The item may therefore not be deleted.

- A **Yes/No** picklist appears from which to select whether the class or classification system and related items at lower levels can be deleted.