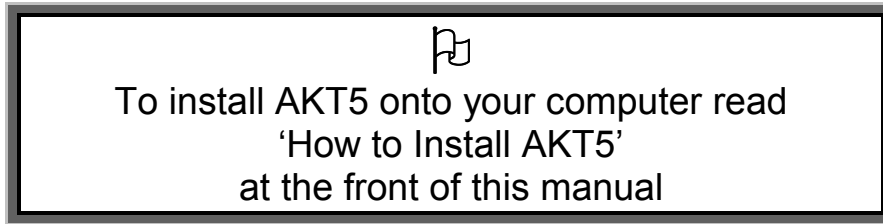


CHAPTER SEVEN - SOFTWARE MANUAL FOR AKT



7.1 INTRODUCTION

AKT provides an environment for the creation of a knowledge base, by allowing you to enter, view and edit knowledge, as well as enabling automated reasoning with the contents of the knowledge bases created.

Each knowledge base created with AKT includes the following information:

- the unitary statements
- source details for each statement
- lists of formal terms, their definitions and synonyms
- memos on individual sources, individual statements and the knowledge base as a whole
- records of any object hierarchies developed
- records of any topics and topic hierarchies developed
- full information about the structure and content of any diagram sets in the knowledge base

Each knowledge base created, is stored as a set of Prolog facts and is managed via the **KB** menu (Figure 7.3 below).

7.2 GETTING STARTED

On opening AKT the first image will be the title page below (Figure 7.1).

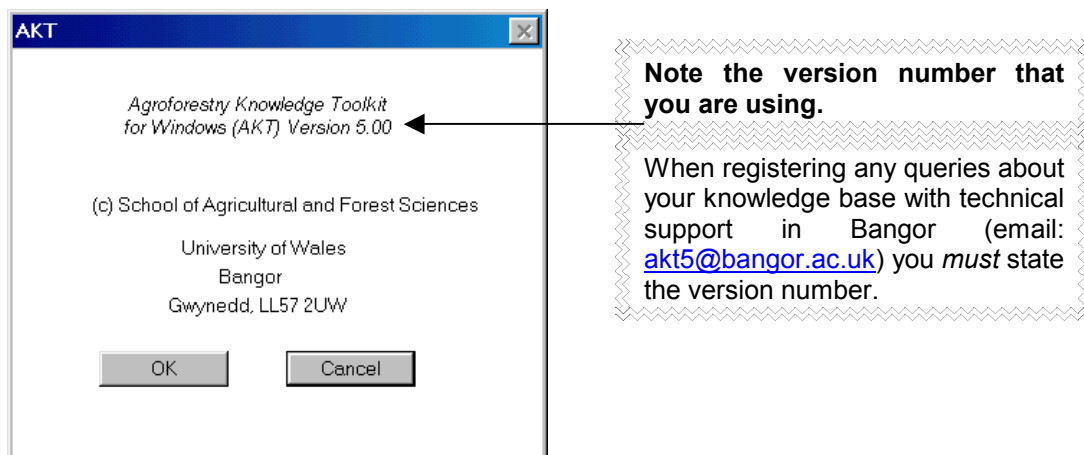


Figure 7.1. Title page of AKT

Click on **OK**. A large blank screen appears with the main menu in the top left-hand corner, as in Figure 7.2.

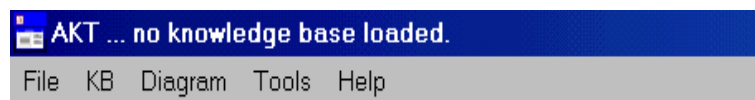


Figure 7.2 *The main menu*

Move the cursor arrow to KB and press. The following menu appears (Figure 7.3)¹;

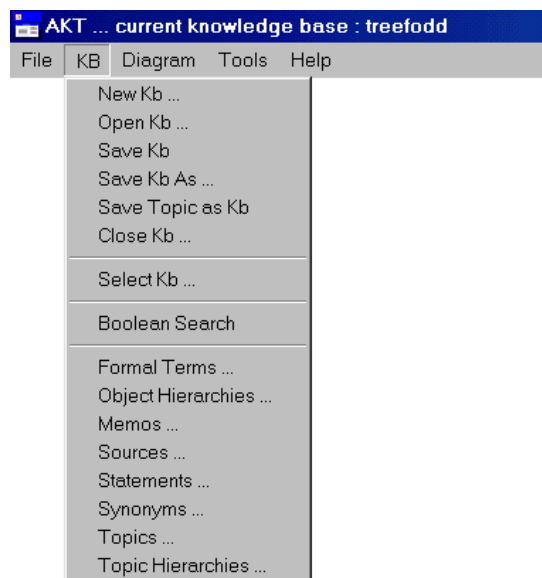



Figure 7.3 *The main KB (Knowledge Base) menu*

A knowledge base file must be opened before work can begin, either by creating a new file (**New KB**) or by opening an existing file (**Open KB**). Other file management options allow the current file to be closed (**Close KB**), the file to be saved (**Save KB**) or the file to be saved under another name or in another location (**Save KB As**). There is also the option of saving all the information about one topic as a separate knowledge base (**Save Topic as KB**).

 **WARNING**

When adding new statements or diagrams to the knowledge base, the programme does not automatically save them. Therefore it is necessary to select **Save KB** from the **KB** menu before closing. It is good practice to save every few minutes to avoid losing work due to power failures etc.

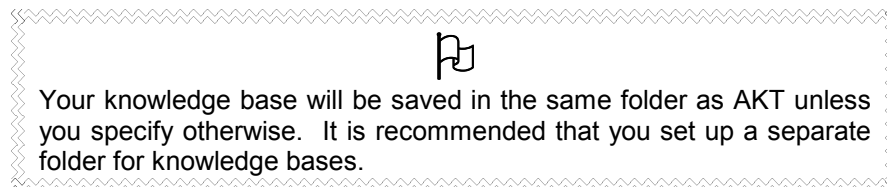
¹ There are two distinct sets of interfaces in AKT for entering, viewing and editing knowledge. These are the **KB** (for Knowledge Base) (Figure 7.3) and the **Diagram** interfaces (Chapter 8). We will begin with the **KB** interface.

7.3 STARTING WORK ON A KNOWLEDGE BASE

When opening the AKT program you will either want to work on a new knowledge base or continue working on an existing one.

7.3.1. STARTING ON A NEW KNOWLEDGE BASE

Select **New KB** from the **KB** menu. You must select the directory in which you wish it to be stored and give the knowledge base file a name.



Type the name and press **Save**. You will then return to the main menu as in figure 7.2 only now the name of the new knowledge base will appear in the top left-hand corner of the screen, in this case 'trees' (Figure 7.4).



Figure 7.4 Opening menu of a newly named knowledge base

7.3.2. OPENING AN EXISTING KNOWLEDGE BASE

If you are opening an existing knowledge base, select **Open KB**. Once you have selected the knowledge base file and pressed **Open** you will return to the AKT main menu with the name of the knowledge base in brackets next to the AKT heading in the top left hand corner of the screen. Simultaneously, a memo dialog box appears on the screen, designed to give the new user a brief introduction into the knowledge base they have selected (see 7.9 below for a full description on the Memo dialog box). Once you have read the information, press **Close** to continue.

7.4. ENTERING KNOWLEDGE THROUGH THE STATEMENT INTERFACE

Formal statements are entered through the **Statements** interface in the **KB** menu (see Figure 7.3). If you are starting a new knowledge base the ‘Statements’ dialog box will be empty as in Figure 7.5 below. If you are adding statements to an already existing knowledge base, the statements previously entered will be listed in the ‘All Statements’ box as in Figure 7.6 showing the ‘Statements’ dialog box in soil.kb².

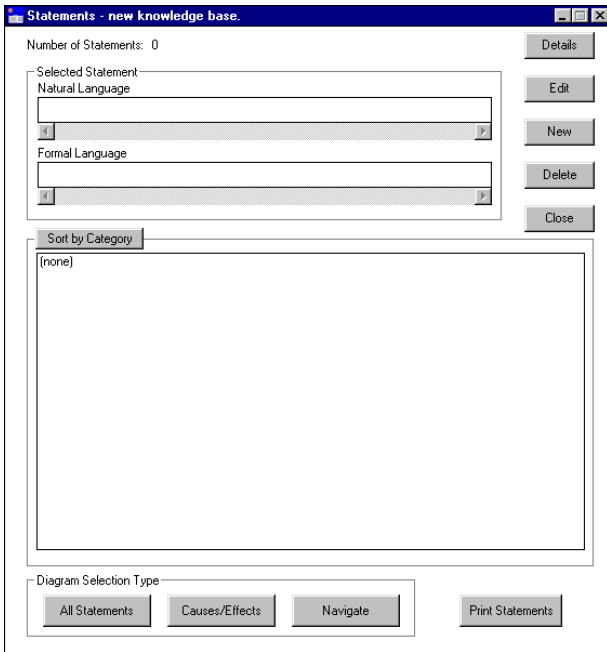


Figure 7.5 The Statements dialog box in a new knowledge base

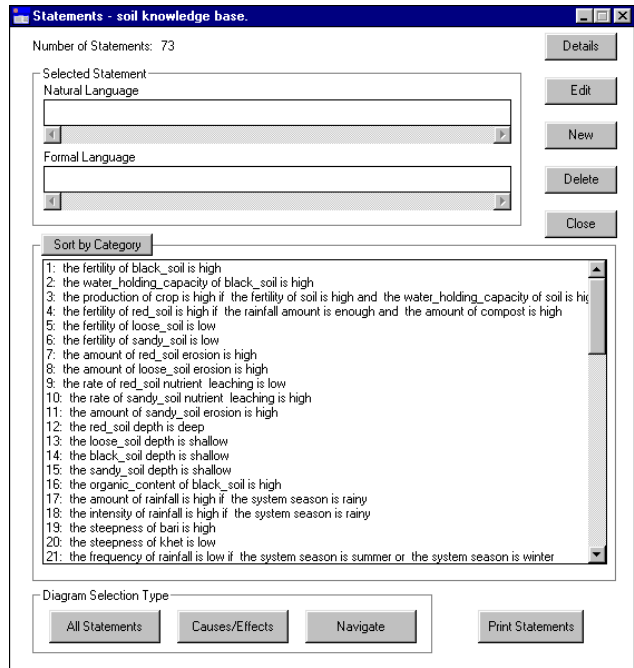


Figure 7.6 The ‘Statements’ dialog box in an existing knowledge base (soil)

In order to enter a new statement select **New**. The following screen will appear (Figure 7.7), requesting information on the ‘Information Source’.

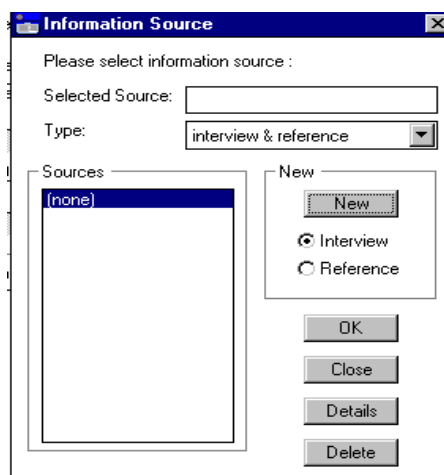


Figure 7.7 Information Sources dialog box

² The examples used throughout the user guide section of this manual are taken from the two knowledge bases provided with the AKT software, ‘soil’ and ‘treefood’.

7.4.1 ENTERING SOURCE INFORMATION

7.4.1.a New sources

It is not possible to enter a new statement via the statement interface without entering the source first, because it is most important to identify the source of each piece of knowledge entered into the knowledge base. A source may be an informant or it may be a reference from a book or journal or other printed matter. .

- If you are starting a new knowledge base, or using a new source, select **New**.
- If you are updating a previous knowledge base in which the source has already been quoted, highlight the relevant source from the list under 'Source'.

If entering a *new* source, select the relevant type (interview or reference) using the radio buttons and either the interview dialog box (Figure 7.8a) or the reference dialog box (Figure 7.8b) will appear.

To create a new 'interview' source, the informant's name, the date of the interview and the informant's gender is recorded. If the sample of farmers interviewed is to be stratified in any way other than by location and gender, it is possible to introduce other criteria into the 'USER defined fields'. In the 'User identifier 1' box, you put the type of stratification, for example, religion, or caste, or wealth ranking, etc. In the box beside it you put the group to which informant belongs e.g. Muslim, or Brahmin, or wealth rank A.

To create a new 'reference' source, the name(s) of the author(s), date of publication, title and other information are recorded³

Figure 7.8a *The interview dialog box*

Figure 7.8b *The reference dialog box*

The year suffix is to enable you to distinguish between multiple interviews (or multiple articles) by the same person within the same year.

If it is felt that more detail is needed either about the informant (for example, age, family background, ethnic group) or about the reference, then this information can be added by selecting **Memo**, and typing the information into the 'Memo attached to source' dialog box (Figure 7.9).

³ In the case of an article, the name of the journal should go in the 'Name' box.

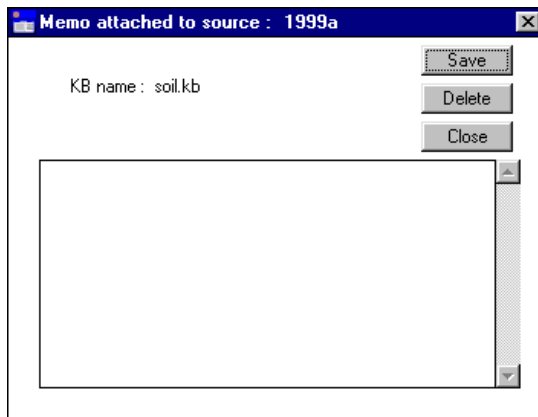


Figure 7.9 The 'Memo attached to source' dialog box, in which extra information about the informant or the reference can be added.

7.4.1.b Sources already entered

If entering new statements but from a source already in the data base, check that the correct source is highlighted and appears in the 'Selected source' box of the 'Information Source' dialog box as in Figure 7.10 below. Then press **OK**.

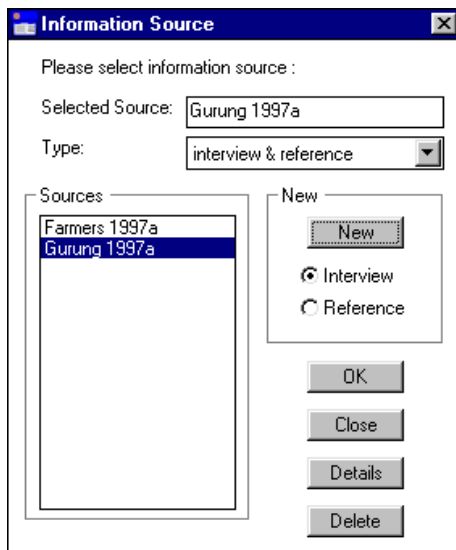


Figure 7.10 Highlighting a source already entered

7.4.2 ENTERING A NEW STATEMENT

Figure 7.11 is an example of a newly entered statement.

Figure 7.11 The 'New Statement' dialog box

All unitary statements have to be entered using the formal language (Chapter 4.2), in the 'Formal Language Statement' box, any conditions are written in the second box, the 'IF' box. After formulating a statement, press **Syntax Check**. If the syntax is correct, a box will appear with 'Syntax Correct', if the syntax is incorrect, a box will appear as in Figure 7.12 or Figure 7.13 depending on where the error lies.

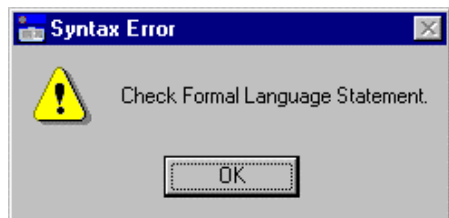


Figure 7.12 Error in the Formal Language Statement

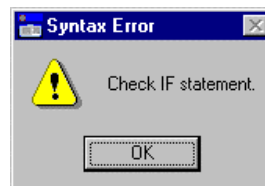


Figure 7.13 Error in IF statement

The formal statement must conform to the grammar described in chapter 4.2. If you receive the error messages, then either the structure of the statement does not conform to the formal grammar, or one of the reserved terms (e.g. att_value) is misspelt. Once the formal language statement has been correctly entered, select **Translate** from the 'New Statement' dialog box for a natural language translation of the formalized statement. The natural language statement generated (Figure 7.14) will be stylised and will not always read smoothly or be grammatically correct, it should, however, make sense and express the meaning of the unitary statement unambiguously.

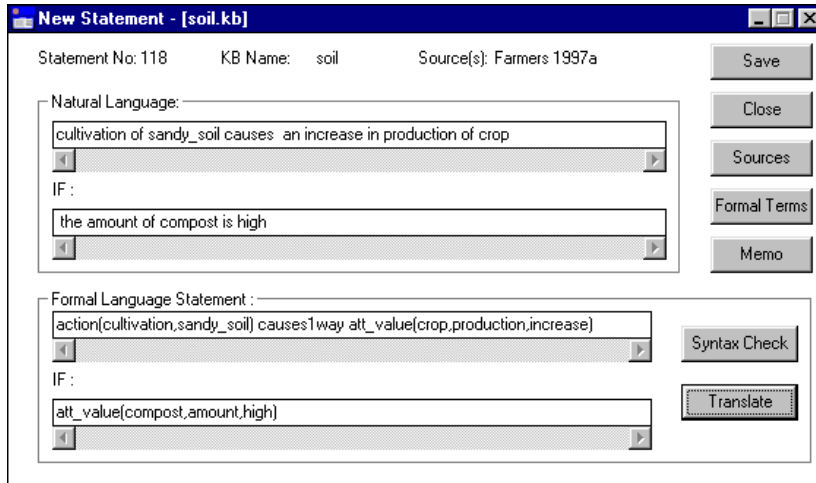


Figure 7.14 Translation of the formal statement into natural language

When you are satisfied with the statement, press **Save**. If you save a statement without a condition a dialog box will appear as in Figure 7.14a asking you to confirm that you wish to save a statement without a condition. If you select **No** you will return to the new statement dialog box.

If your statement includes any formal terms new to the knowledge base, before the statement is saved a dialog box will appear, asking you whether you want to create the new formal term (Figure 7.14b). A new dialog box will appear for each new formal term. The purpose of this is to make you aware that you are creating a new formal term, to cut down on the number of synonymous terms used and the number of spelling mistakes.

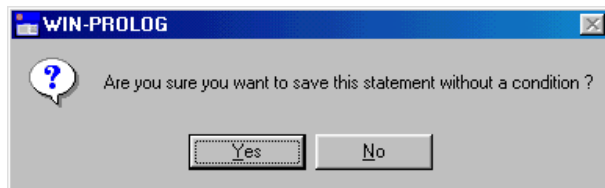


Figure 7.14a Saving a statement without a condition

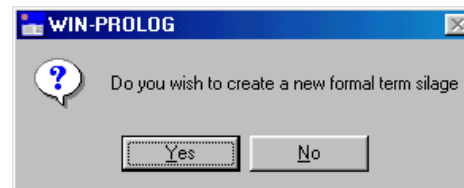
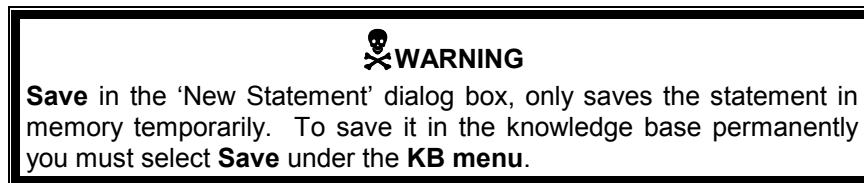


Figure 7.14b Creating a new formal term within a statement

If you press **Yes** (Figure 7.14b) then a new dialog box appears, announcing 'Statement saved'. If you press **No** then the statement will not be saved and you will be returned to the New Statement dialog box.



7.4.3 EDITING A STATEMENT

Once a new statement has been saved, the programme automatically reverts back to the updated 'Statements' dialog box (Figure 7.15) from which all existing statements can be accessed. For large knowledge bases, accessing particular statements may be facilitated by doing a Boolean Search, restricting the statements to a set containing the formal terms of interest (see section 7.9 below).

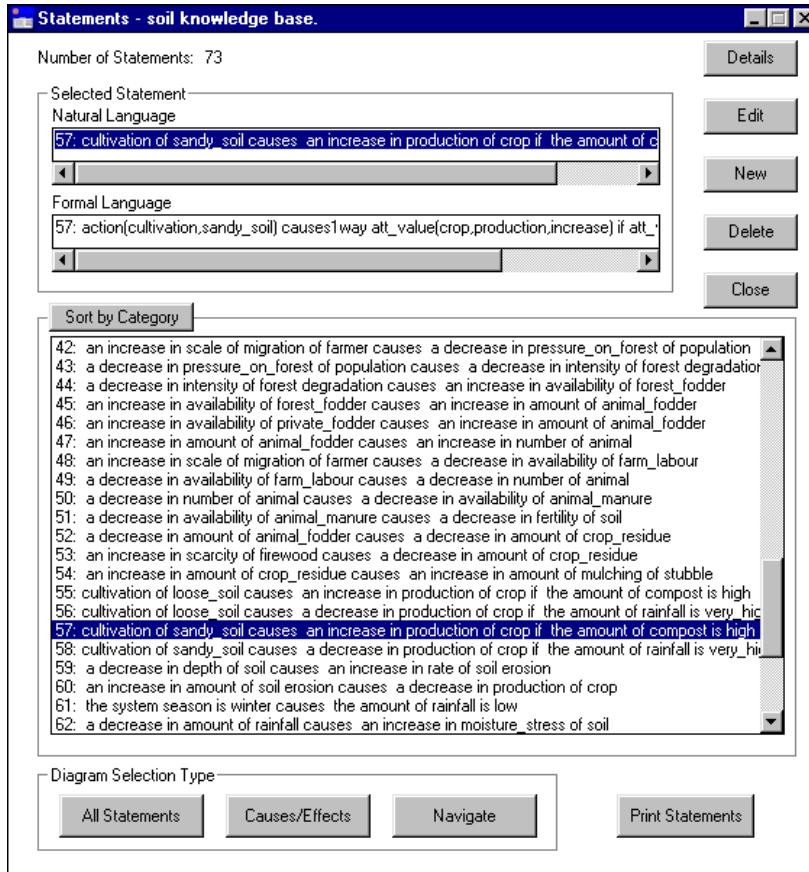


Figure 7.15 'Statements' dialog box

From the 'Statements' dialog box it is possible to check all the details of a statement (the sources, the formal terms, any definition of those formal terms, any synonyms, and any memos) and to edit that statement.

Highlighting the relevant statement and selecting **Details** will allow you to check all these details without the danger of making any inadvertent alterations.

Highlighting the relevant statement and selecting **Edit** permits you to edit the statement and all its appended details (Figure 7.16).

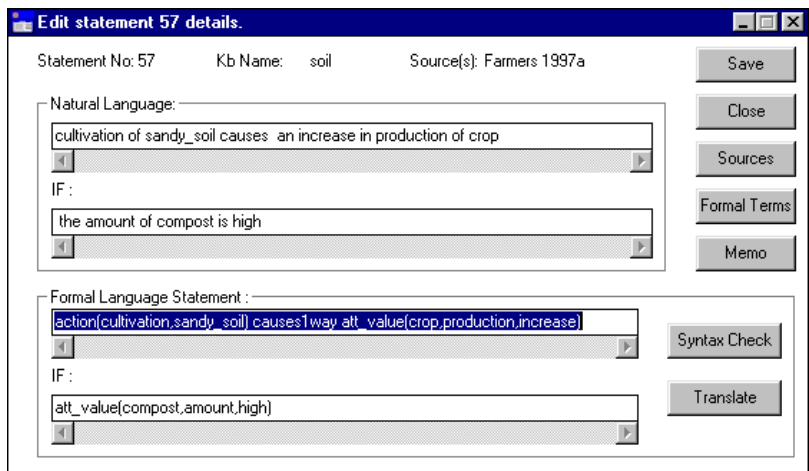


Figure 7.16 The 'Edit statement' dialog box

7.4.3.a Adding definitions to formal terms

It is important that all formal terms remain as unambiguous as possible. However, different users may have a different understanding or concept of the same term. For example ‘alley cropping’ may suggest to some a system where the tree component is made up of a single or multiple row of trees, whilst others envisage a system of dense hedgerows. For this reason it is useful to be able to define exactly what is meant by the term in the context of a specific knowledge base.

In order to add definitions select **Formal Terms** in the ‘Edit statement’ dialog box (Figure 7.16 above) and the following screen appears (Figure 7.17);

The ‘Statement Formal Terms’ dialog box displays two lists, the first, headed ‘Statement Formal Terms’ gives a list of all the formal terms within that particular statement. By highlighting one of the terms, that term’s type (i.e. object, process, action, attribute, value, link or comparison) will be displayed in the ‘Type’ box. The second list, headed ‘Formal Terms’ gives a list of all the formal terms within the knowledge base. This serves as a reference and should be consulted so as to avoid unnecessary use of synonymous terms. In order to define any of the terms, highlight the required term, and select **Details**. The ‘Formal Term Details’ dialog box will appear (Figure 7.18). The ‘Formal Term Details’⁴ dialog box enables you to:

- define the term by filling in the ‘Definition’ box;
- check whether the term has any synonyms;
- check in which statements the term has already been used by selecting **Show use in statements**; and
- check whether the term already appears in an object hierarchy by selecting **Show use in hierarchies**.

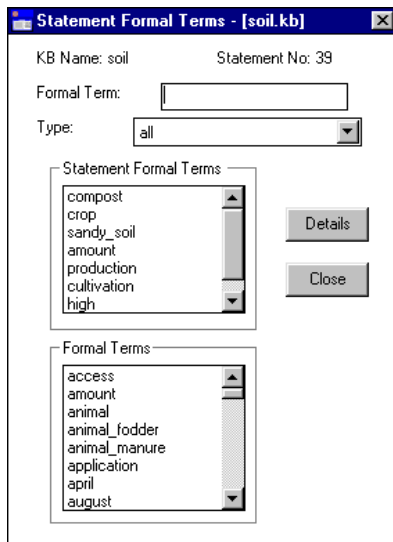


Figure 7.17 The ‘Statement Formal Terms’ dialog box

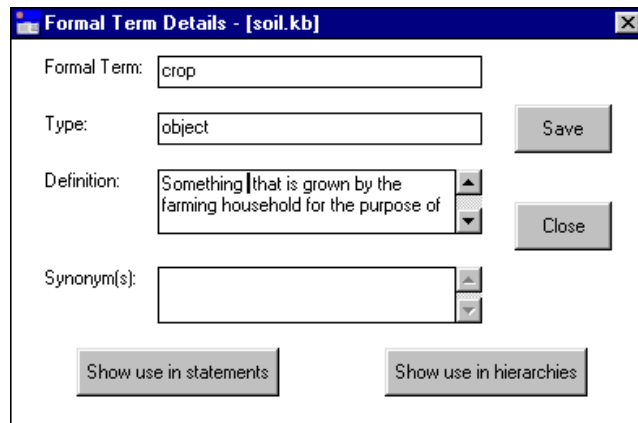



Figure 7.18 ‘Formal Term Details’ dialog box


 After editing a statement it is advisable to save the whole knowledge base through the main **KB** menu.

⁴ For a more detailed description of ‘Formal Term Details’ see section 7.7.

7.4.3.b Appending or detaching additional sources

It may be that there is more than one source for a particular statement. In that case only the first source is given when the new statement is entered into the knowledge base. If the other sources have already been entered into the knowledge base, either attached to other statements or via **Sources** in the main **KB** menu, then they can be appended to the statement at this stage.

✎

A new source, i.e. one not yet been entered into the knowledge base, cannot be attached to a statement via this route. It must first be entered into the knowledge base via **Sources** under the **KB** menu (see section 7.6)

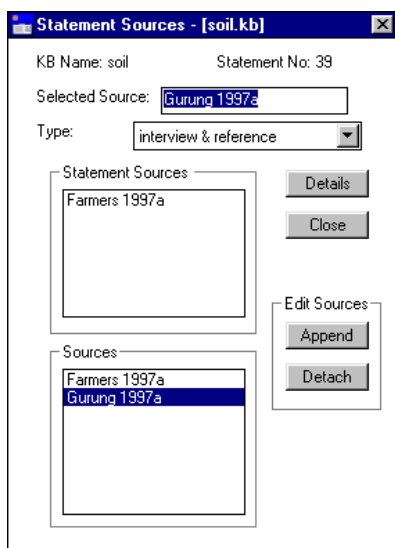


Figure 7.19 'Statement sources' dialog box

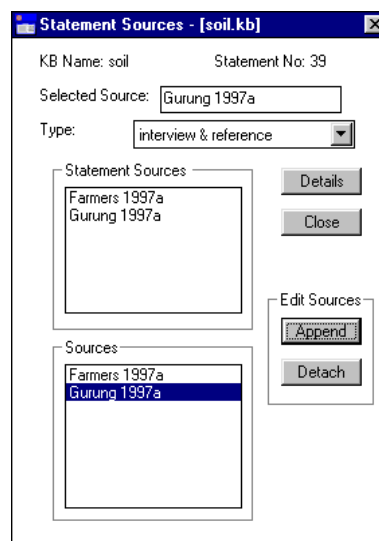


Figure 7.20 A new source appended to 'Statement Sources' list

In order to append a source to the statement in the 'Edit Statement' dialog box select **Sources**. The 'Statement Sources' dialog box appears (Figure 7.19). Highlight the source you wish to append to the statement from the 'Sources' list and then select **Append**. A message will appear, confirming that the source has been appended to the statement (Figure 7.21) and the newly appended source will appear in the upper list under 'Statement Sources' (see above, Figure 7.20).

If you wish to detach a source from a statement, highlight the source to be detached from the statement in the 'Statement Sources' list and select **Detach**. The source will be removed from the 'Statement Sources' list, although it will remain in the 'Sources' list. A message will appear, confirming that the source has been detached from the statement (Figure 7.22).

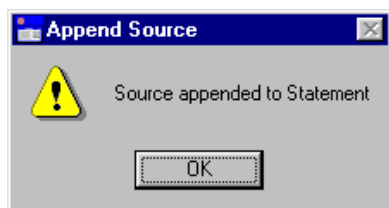


Figure 7.21 Message confirming that a source has been appended to a statement

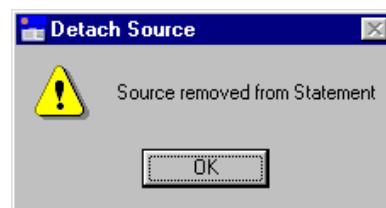



Figure 7.22 Message confirming that a source has been detached from a statement



A statement *must* have a source. If there is only one source attached to the statement, it is not possible to detach it.

7.4.3.c Appending Memos

Statements may need certain clarifications which cannot be expressed in the formal language and therefore have to be appended to the statement in the form of a memo. For instance, in the example given here of a new statement:

Cultivation of sandy_soil causes an increase in production of crop if the amount of compost is high (Figure 7.14, above)

it may be appropriate to list in the memo field what the compost is made of. It is better to put the explanation here, rather than in the 'Formal Terms' dialog box, because the type of compost referred to may differ from statement to statement, and the Memo dialog box is attached to the individual statement. To add a memo, select **Memo** from the 'Edit Statement' dialog box, and the following dialog box appears (Figure 7.23);

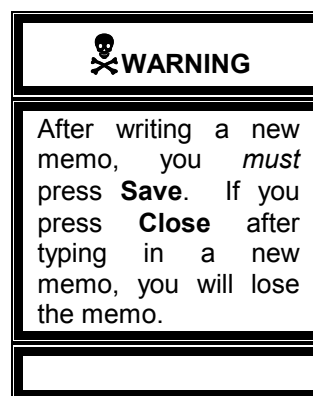
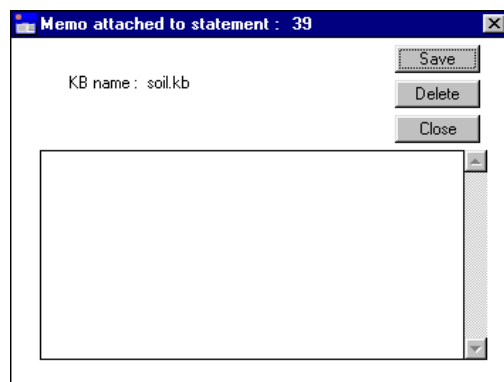


Figure 7.23 The 'Memo' dialog box, attached to a specific statement

It is now possible to enter any information about the statement that has not been adequately expressed by formal language. There is ample room to write the memo in some detail, the scroll bar on the right enabling you to read all the passage. Once the memo is complete, press **Save**. A message will appear, 'Memo saved O.K.'. If you choose to delete a memo, select **Delete**. A message will appear 'Memo deleted.'. If you just want to read a previously written memo, then select **Close** when finished.

7.4.4 DELETING A STATEMENT

In order to delete a statement, enter **Statements** via the main **KB** menu and highlight the statement you wish to delete. The statement will appear in the 'Selected Statement' box. Then press **Delete**. A message will appear, giving the natural language translation of the statement to confirm whether you really want to delete that statement (Figure 7.24).

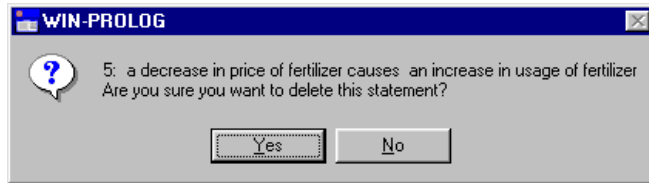


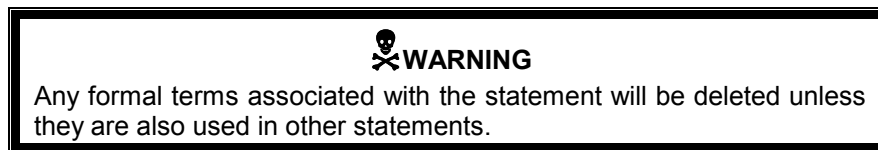
Figure 7.24 Message requesting you to confirm whether you wish to delete the highlighted statement



Figure 7.25 Message confirming that the statement has been deleted

If **Yes** is selected, another message appears (Figure 7.25) confirming that the statement has been deleted.

If you wish the statement to be permanently deleted from the knowledge base, you must save the knowledge base after deleting the statement.



7.4.5 DIAGRAMMATIC REPRESENTATION

At the bottom of the Statement card are various options for diagrammatic representation (Figure 7.26).

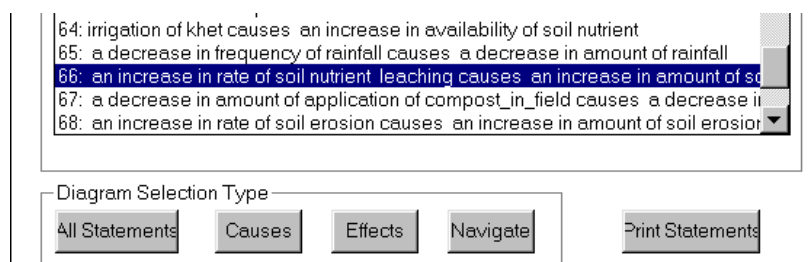


Figure 7.26 The diagram options at the bottom of the Statements card

If you select **All Statements** it will give you a diagram of all the causal and link statements in the knowledge base.

If you highlight a statement and press **Causes** it will give you a diagram showing all the connections (i.e. causes) flowing *into* the selected statement. If you highlight a statement and press **Effects** it will give you a diagram showing all connections (i.e. effects) flowing *out of* the selected statement. If there are no causes or no effects of a particular statement a message will appear to inform you of the fact.

If you highlight a statement and press **Navigate**, it will give you a diagram of the immediate causes and effects of the selected statement, from which you can build up the diagram further from within the diagram interface. Diagrammatic representation is dealt with in detail in Chapter 8.

7.4.6 SORTING STATEMENTS IN THE STATEMENT CARD

The statements in the statement card can be sorted either numerically, or by type (attribute, causal, comparison or link statements). When you open a knowledge base, or create a new one, the statements will be listed numerically. To list them by statement type press the **Sort by Category** button at the top of the statement card (see above, Figure 7.6). If the statements are sorted by category the button changes to **Sort Numerically**.

7.4.7 INVERSE STATEMENTS AND NUMBERING

Each two way causal statement (i.e. those using 'causes2way') generates an invisible inverse statement, a statement that is used in reasoning but is not displayed on the screen (see above Chapter 4.2.4.a). Each time a knowledge base is loaded all statements are renumbered from 1 to the total number of statements. The inverse statements are then generated and added to the knowledge base with numbers following on from the visible statements. For this reason, when you begin adding new statements to a knowledge base, the statement number will not be the next number available in the list of visible statements but the next number available after the *invisible* inverse statements. This is the reason for any gap in the sequence of numbers between the last visible statement on the statement card and the number given to the first new statement. Figure 7.26a below demonstrates this, the last number in the original knowledge base was 756, the number allocated to a new statement is 918. That means 162 inverse statements have been created after loading the original knowledge base.

```
753: posilo_fodder_tree tree_fodder mainly_fed_to large_animal
754: kam_posilo_fodder_tree tree_fodder not_fed_to ox
755: painyu tree_fodder not_fed_to cattle
756: cattle_fodder_tree tree_fodder fed_to large_animal
918: the_nutrient_value of silage is high
```

Figure 7.26a *Demonstrating the gap between the last number of the visible statements and the first number of any new statements. The difference (162) is taken up by a set of invisible inverse statements.*

7.5 OBJECT HIERARCHIES

AKT allows you to generate a hierarchy of objects. This provides an indexing system for the otherwise unsorted unitary statements that constitute the knowledge base. A single knowledge base may contain a number of discrete hierarchies, and a single object may occur in more than one hierarchy.

The creation and manipulation of object hierarchies are controlled by the **Object Hierarchies** menu under the main **KB** menu.

7.5.1 CREATING OBJECT HIERARCHIES

A new object hierarchy is created by selecting **New** (Figure 7.27). In the new dialog box that appears, 'New Object Hierarchy' (Figure 7.28) a new hierarchy name has to be given. The 'New Hierarchy Name' can be either one of the objects which occurs in the unitary statements or it can be a completely new name, not directly related to any of the unitary statements but

which provides a means of identifying the relationship between the other objects appearing in the hierarchy. Enter the name and press **Save**.

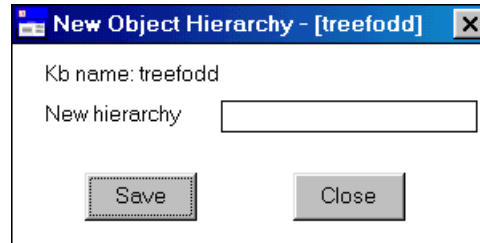
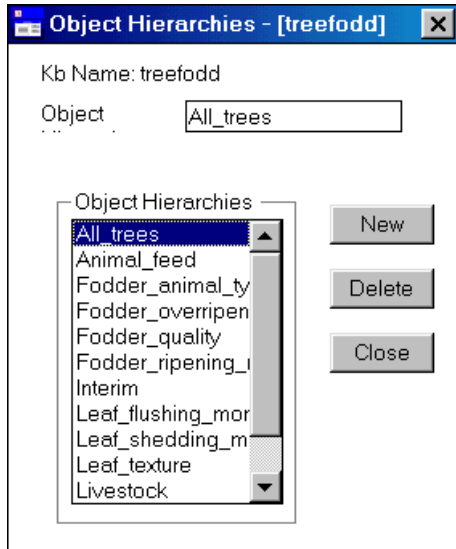


Figure 7.28 Dialog box for New Object Hierarchy

Figure 7.27 Dialog box for object hierarchies

Once a hierarchy name has been entered and saved, the dialog box will revert to the 'Object Hierarchies' dialog box with the new hierarchy name included in 'Object Hierarchy' list.

7.5.2. VIEWING OBJECT HIERARCHIES

To view an object hierarchy, highlight the relevant hierarchy from the 'Object Hierarchies' list in the 'Object Hierarchies' dialog box and the object hierarchy details will appear automatically.

The screen below (Figure 7.29) is the 'Object Hierarchy' dialog box for the object hierarchy 'Livestock' in the 'treefodd' knowledge base. The left-hand side of the dialog box shows the 'Objects in Hierarchy' list, which is simply an alphabetical list of all the objects in the hierarchy. The central panel headed 'Hierarchy Structure' gives the structure of the hierarchy immediately above and below the selected object, with the selected object highlighted in the middle box under 'Object' and also in the 'Selected Object' box at the top, under the hierarchy name.

In Figure 7.29 the object in the 'Selected Object' box is Livestock. As that is also the hierarchy name, there are no objects listed in the SuperObjects box. In the 'Immediate SubObjects' box are listed 'animal' and 'bird'. If we highlight another object in the 'Objects in Hierarchy' list, for example, 'large_animal', the objects in the 'Hierarchy Structure' section will automatically change to Figure 7.30. Now 'animal' appears as the superobject and 'buffalo' and 'cattle' as the immediate subobjects.

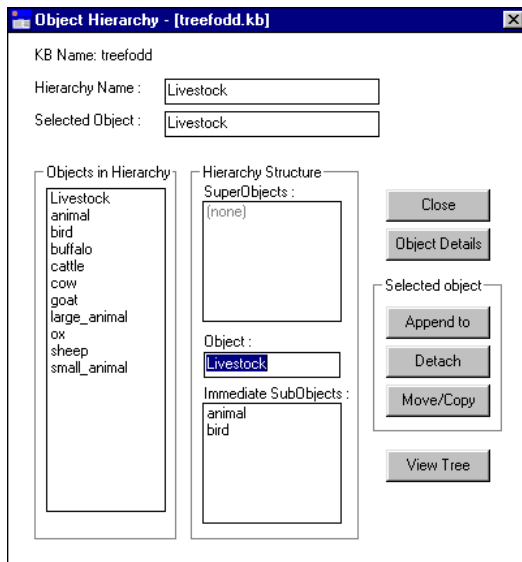


Figure 7.29 'Object Hierarchy' dialog box

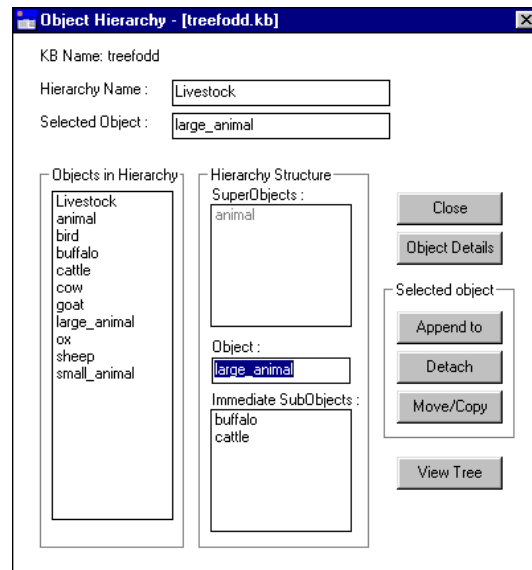


Figure 7.30 Highlighting large_animal in the 'Object' box of the hierarchy structure.

To get a comprehensive view of the 'Livestock' hierarchy structure, select **View Tree**. The following diagram appears (Figure 7.31), the scroll bars enabling you to view the whole diagram. It is also possible to copy the hierarchy tree and paste it to another package, by pressing the **Copy to Clipboard** button. Open the package and paste the hierarchy tree immediately by selecting **Edit** and then **Paste** or by pressing **Ctrl v**.

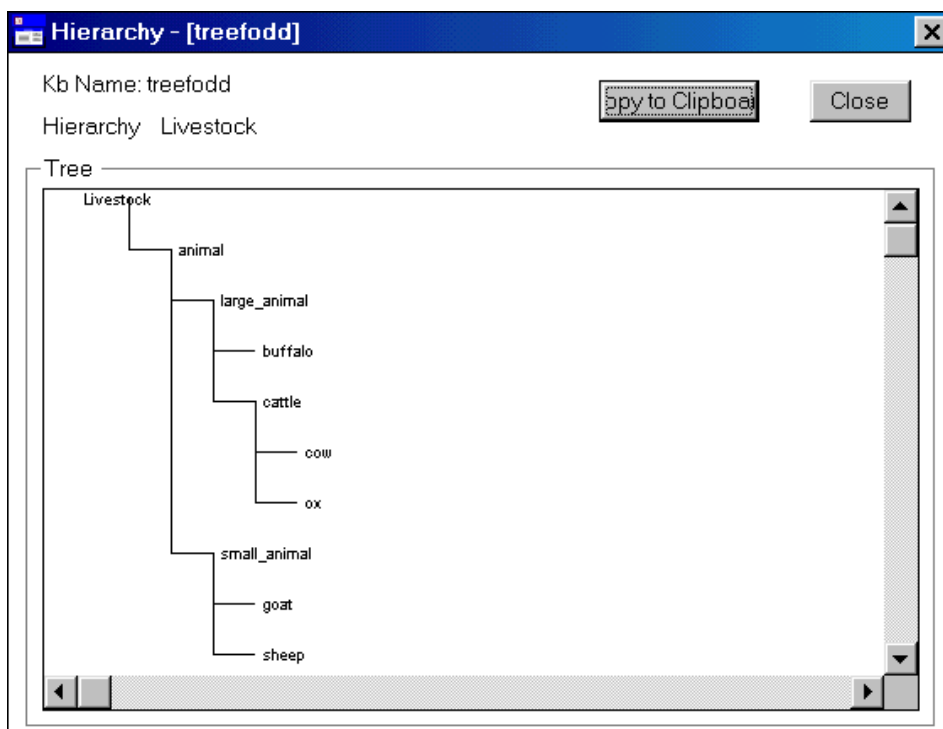


Figure 7.31 A diagram of the 'Livestock' hierarchy, generated by selecting **View Tree**

7.5.3 BUILDING / EDITING OBJECT HIERARCHIES

7.5.3.a Adding objects

To build up an object hierarchy, or to add to one already extant, highlight the relevant hierarchy from the 'Object Hierarchies' list and the 'Object Hierarchy' dialog box will automatically appear. Figure 7.32 is of the 'Object Hierarchy' dialog box for a newly created hierarchy with no objects attached.

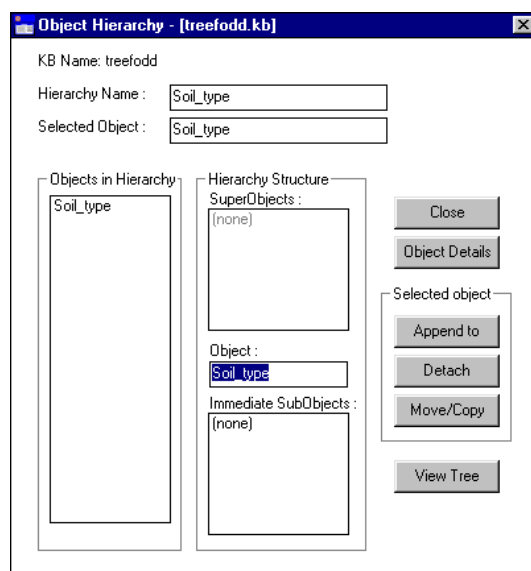


Figure 7.32 The 'Object Hierarchy' dialog box of a newly created object hierarchy

To add objects to a hierarchy, select **Append to**. The resulting screen (Figure 7.33) will offer you a list of all the objects in the knowledge base. Highlight the desired object under the 'Objects' list and select **Append**. The message 'Object appended to Hierarchy' will then appear (Figure 7.34) and the object will appear as an Immediate SubObject of the hierarchy root.

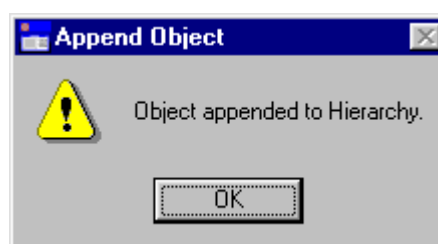
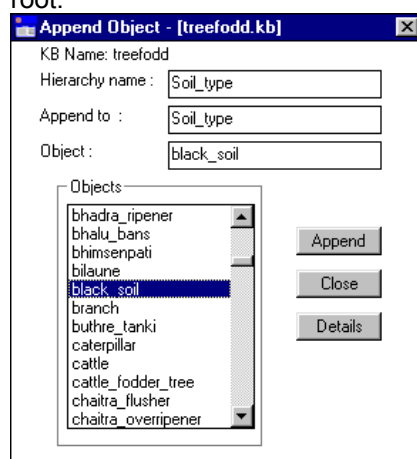


Figure 7.34 Message confirming that the object has been appended to the object hierarchy

Figure 7.33 Selecting an object to append to an object hierarchy

Any number of objects can be appended to the object hierarchy in this way, appending them one at a time.

The objects that appear in the object list (Figure 7.33 above) are taken from the statements entered onto the knowledge base. However it may be useful to add objects to the object

hierarchy that do not appear in any of the statements but are implied by a more generic term. For instance, farmers may refer frequently to 'livestock', without mentioning the species. For the comprehensiveness and the power of the knowledge base it is nevertheless useful if the researcher can list the species kept, under a 'Livestock' hierarchy. To add objects that do not appear in the statements, you must first add them to the knowledge base as new formal terms (see 7.7.2) and then add them to the object hierarchy.

If you wish to create a hierarchic structure within the object hierarchy, then first select the root, or parent object from the list of objects. This object will then appear in the 'Object' box in the 'Hierarchy Structure' and objects can be appended to it as before. In Figure 7.35, black_soil is the head of the sub-hierarchy, and loose_soil is the new subobject.

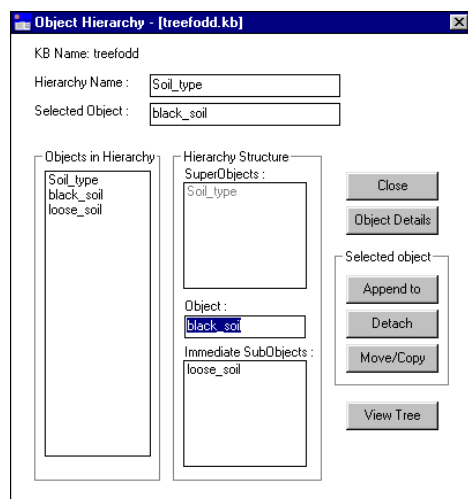
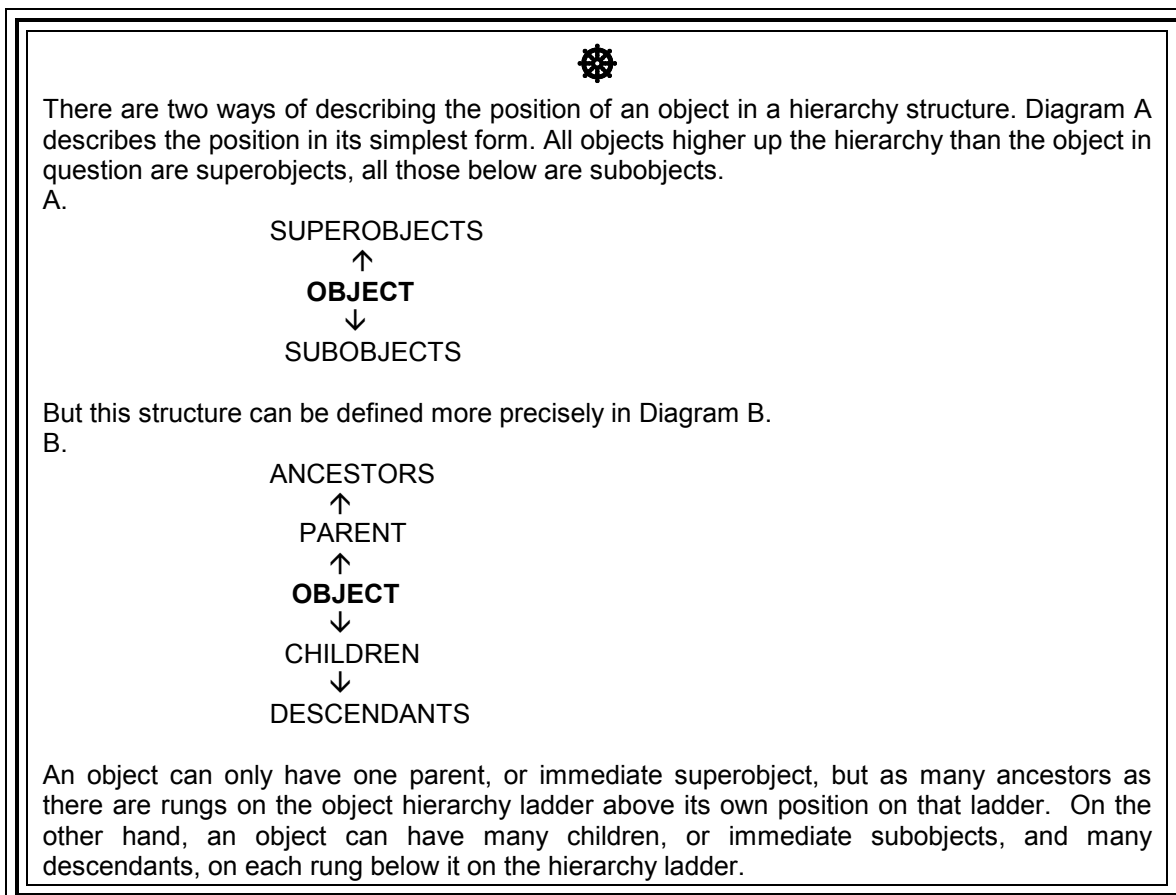


Figure 7.35 Demonstrating an object hierarchy, in which 'black_soil' is the selected object, 'loose_soil' its sub-object and 'Soil_type' its parent.



7.5.3.b Detaching objects

To detach an object from an object hierarchy, enter the relevant 'Object Hierarchy' dialog box and highlight the object to be detached in the 'Objects in Hierarchy' list. The object will then appear in the 'Selected Object' box and in the 'Object' box within the 'Hierarchy Structure'. In Figure 7.36 this is the object 'goat'. Then press **Detach**.

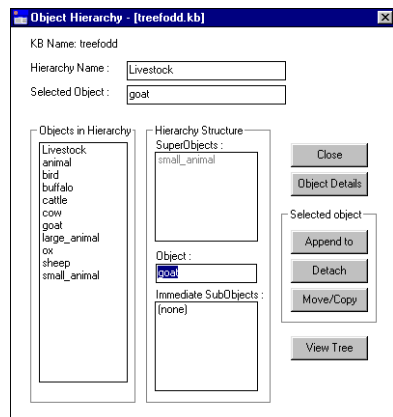


Figure 7.36 Detaching 'goat' from an object hierarchy

The following message appears (Figure 3.37) asking whether to detach the selected object. Press **Yes** and another message appears, confirming that the object 'goat' has been removed (Figure 7.38).

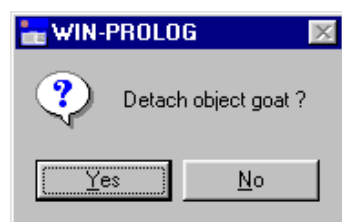


Figure 7.37 Message to confirm detaching object

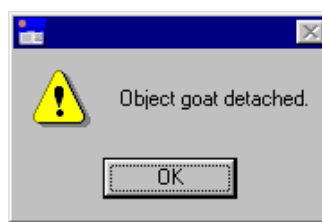


Figure 7.38 Message confirming that the object has been detached

The object 'goat' is now removed from the object hierarchy 'Livestock', although it still exists as a formal term in the knowledge base.

If you wish to detach an object which is the head of a sub-hierarchy, for instance 'large animal' in Figure 7.39, which has 'buffalo' and 'cattle' as sub-objects, once you have pressed **Detach**, and confirmed that the object is to be detached (as in Figure 7.37 above), a new message appears (Figure 3.40).

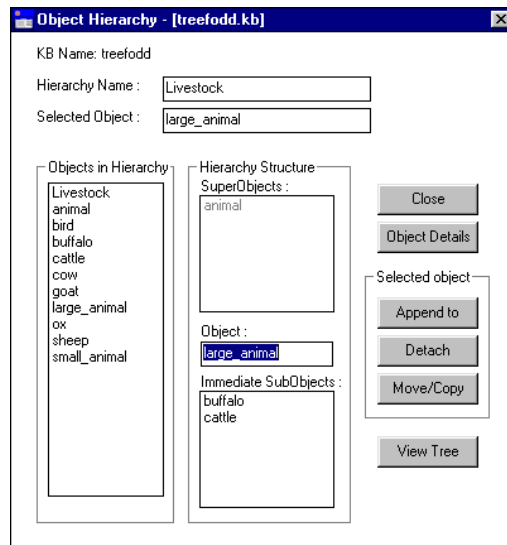


Figure 7.39 Detaching an object with sub-objects attached

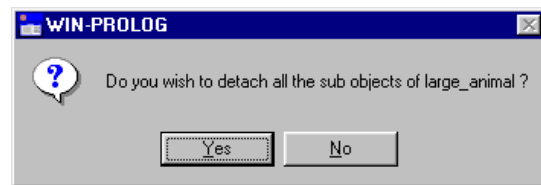


Figure 7.40 Message displayed when detaching an object with sub-objects attached

The program asks whether or not you wish to detach all the sub-objects together with the selected object. If you press **Yes** then in this case 'buffalo' and 'cattle' will be removed from the object hierarchy as well. If you press **No** then another message appears (Figure 7.41), which confirms that the object has been detached and its sub-objects raised up a level within the hierarchy.

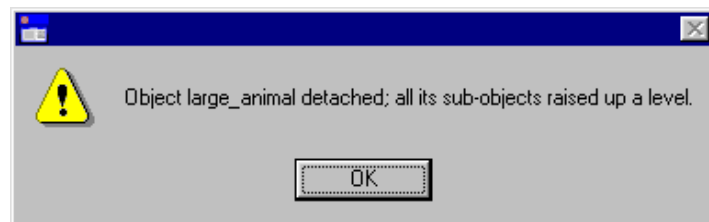


Figure 7.41 Message appearing if an object is detached but its sub-objects are left in place

7.5.3.c Moving objects within a hierarchy

It may be necessary to rearrange an object hierarchy, moving objects to different levels within the hierarchy. In the below example, Figure 7.42, 'chickens', 'ducks' and 'geese' have been added to the Livestock hierarchy, and are directly below 'Livestock' on the hierarchy tree. However, it would be more appropriate to put them under 'bird'. In order to do this highlight the first object, 'chickens', in the 'Objects in Hierarchy' list and press **Move/Copy**. The 'Move Object' dialog box appears (Figure 7.43).

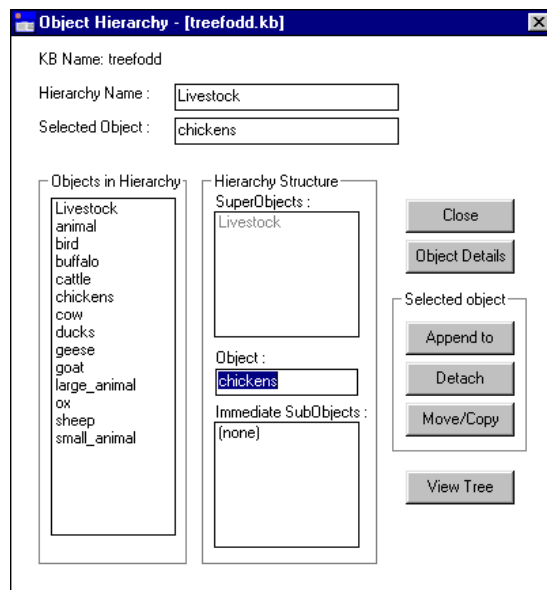


Figure 7.42 Highlighting an object before moving it within an object hierarchy

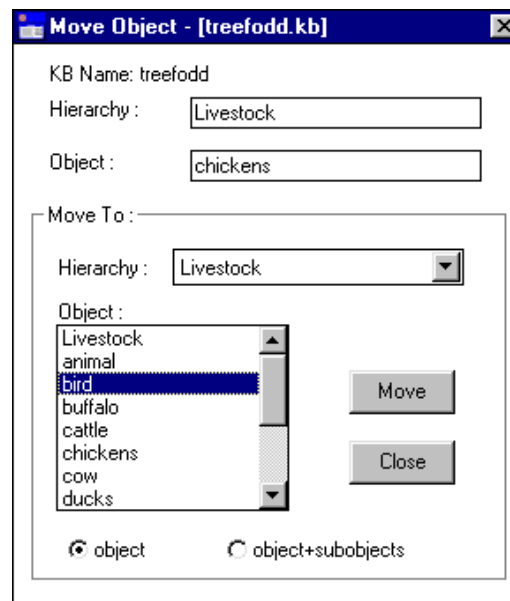


Figure 7.43 Moving an object to another part of the object hierarchy

The 'Move Object' dialog box gives the name of the hierarchy in use ('Livestock'), and the object to be moved ('chickens'). The 'Move To:' section allows you to select the hierarchy to which is to be moved, and under 'Object' lists the objects within that hierarchy under which the object can be placed. At the bottom of the dialog box is the option to move, either just the object, or the object plus its sub-objects. In this case the object 'chickens' has no subobject, so the 'object' bullet is highlighted. Then press **Move**. The following message appears (Figure 7.44);



Figure 7.44 The message confirming an object has been successfully moved within an object hierarchy

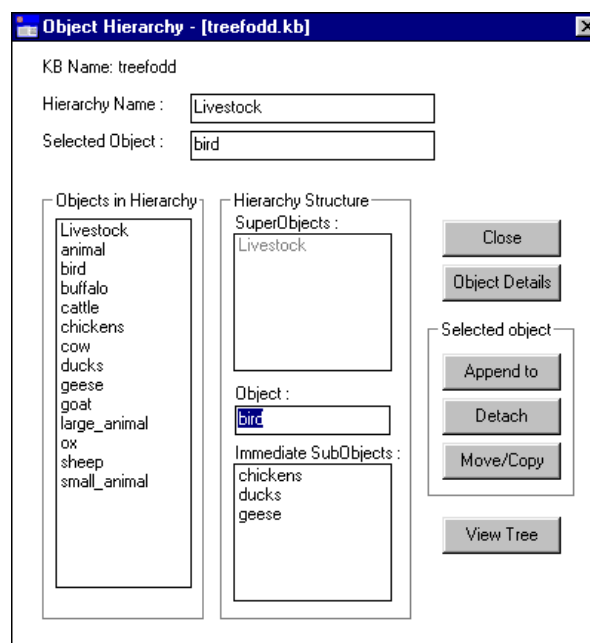


Figure 7.45 An object ('bird') and its three immediate subobjects ('chickens', 'ducks' and 'geese'), after they have been moved within the object hierarchy.

Exactly the same procedure is carried out for 'ducks' and 'geese', so that all three are now subobjects of 'bird' as in the 'Object Hierarchy' dialog box in Figure 7.45.

7.5.3.d Copying objects between hierarchies

It is possible to copy objects with or without their immediate sub-objects between different object hierarchies. To do this, follow the same procedure as above, highlighting the object to be copied in the 'Objects in Hierarchy' list in the 'Object Hierarchy' dialog box and press **Move/Copy**. In the example below, Figure 7.46, we are copying the sub-hierarchy 'bird' to the object hierarchy 'Plant_pest'. In the 'Move Object' dialog box the present hierarchy name 'Livestock' is in the top 'Hierarchy' box. In the 'Copy To:' section the hierarchy 'Plant_pest' has been selected from the drop down menu. The objects in the 'Object' list are now all objects from the 'Plant_pest' hierarchy. Highlight the object under which the new object should be copied. In this case it is 'crop_pest' (Figure 7.47) Then select whether the object alone should be copied or the object plus its sub-objects by selecting the relevant radio button. In this case the subobjects of 'bird', 'chickens', 'ducks' and 'geese' cannot be described as crop pests, therefore the object 'bird' is moved alone, without its subobjects.

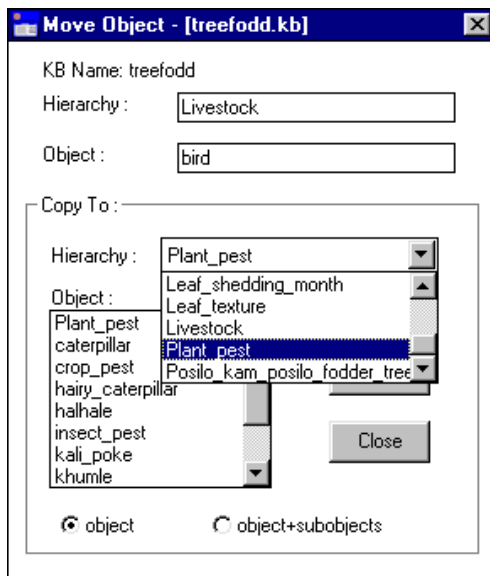


Figure 7.46 Selecting the new object hierarchy to which the object is to be copied

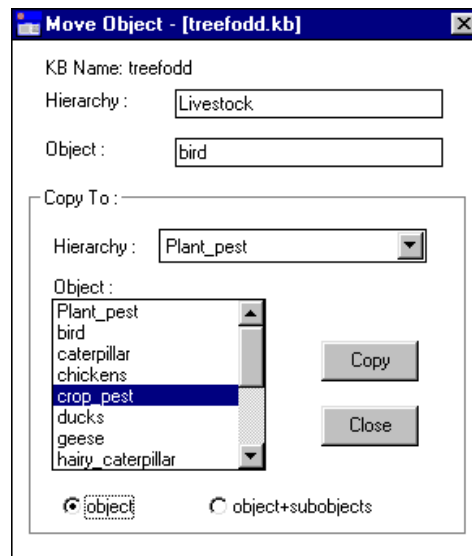


Figure 7.47 Selecting the object under which the object to be copied is to appear

Then press **Copy**. The object is then automatically copied to the new object hierarchy.

✎

It is only possible to *copy* objects and objects + subobjects from one hierarchy to another, not to *move* them. If you want to move them, copy the objects to the new object hierarchy and then detach them from the original object hierarchy as described in 7.5.3

7.6 SOURCES

Sources are usually entered into the knowledge base when statements are being entered either via the Statements dialog or via the Diagram interface (see chapter 8) as a statement cannot be entered without a source (see above, 7.4.2). However, only one source per statement can be entered via the **Statements** menu (see above, 7.4.1), whereas there may be several sources for one statement. Additional sources can therefore be entered via **Sources** in the main **KB** menu.

The 'Information Source' dialog box is exactly the same as that entered via the Statements dialog (see 7.4.2). Figure 7.48 below is the 'Information Source' dialog box of the knowledge base, 'treefodd'.

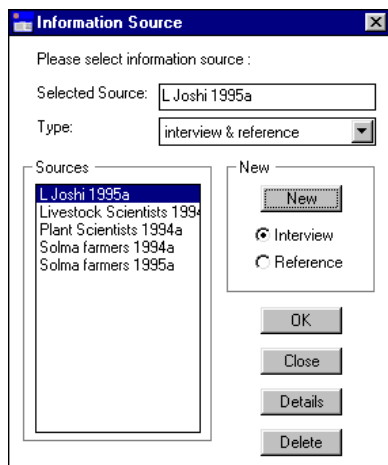


Figure 7.48 The 'Information Source' dialog box, entered directly via **Sources** in the main **KB** menu

The details of existing sources can be accessed via **Details**. New sources can be entered by highlighting the relevant radio button and pressing **New**. The two dialog boxes 'Create a new 'interview' source' and 'Create a new 'reference' source' function in exactly the same way as described in 7.4.2.

Sources can be deleted by selecting **Delete**. However, sources which are attached to statements can *only* be deleted if there is more than one source for that particularly statement.

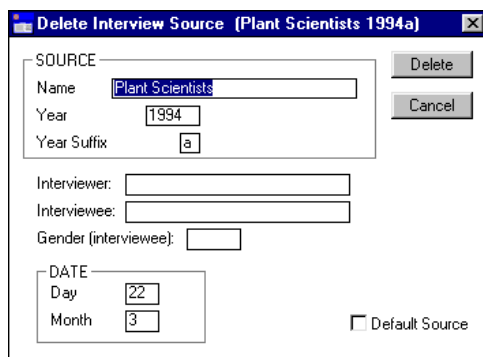


Figure 7.49 The first step in deleting a source

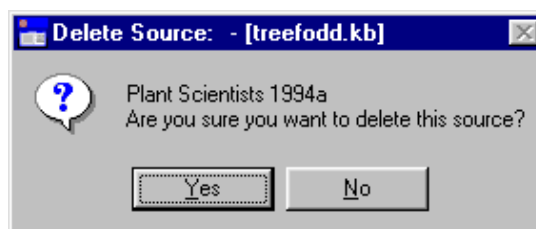


Figure 7.50 The second step in deleting a source

Figures 7.49 to 7.51 describe the steps taken to delete the source 'Plant Scientists 1994a' from the knowledge base 'treefodd'. 'Plant Scientists 1994a' is the sole source for some of the statements within the knowledge base. For this reason the message appears saying that it cannot be deleted (Figure 7.51).

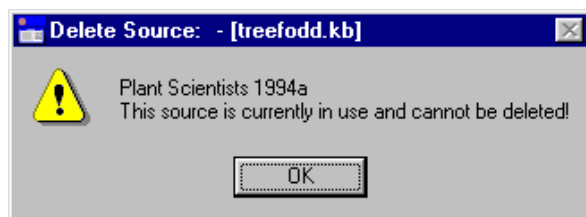


Figure 7.51 The message that appears if a source is the sole source for a statement and therefore cannot be deleted.

7.7 FORMAL TERMS

7.7.1 VIEWING FORMAL TERMS

Formal Terms, under the main **KB** menu brings up a glossary for all the formal terms in the knowledge base. Selecting a formal term type (object, process, action, attribute, value, link and comparison) from the 'Type' box will bring up the glossary for that type (Figure 7.52). Unlike object hierarchies, these glossaries can only be flat - simply an alphabetical list of terms. Items are added to glossaries automatically during the process of formal representation. The details of each term can be accessed by selecting **Details**. The 'Formal Term Details' dialog box (Figure 7.53) gives the formal term type, its definition and any synonyms there may be. If you select **Show use in statements** a dialog box 'Search Results' appears, giving all the statements in which the formal term appears (Figure 7.54). For objects it is also possible to select **Show use in hierarchies**. If the object appears in any hierarchies the relevant hierarchy names will appear (Figure 7.55). In the example below, the formal term 'cattle' appears in three formal statements and in the object hierarchy, 'Livestock'.

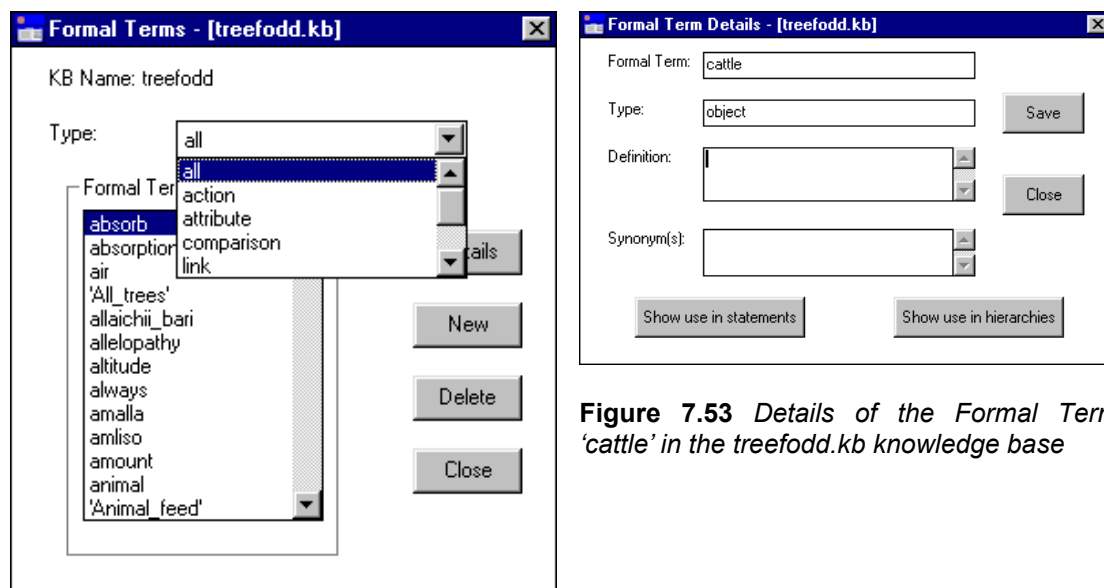


Figure 7.52 Selecting the type of formal term in the Formal Terms dialog box

Figure 7.53 Details of the Formal Term 'cattle' in the treefodd.kb knowledge base

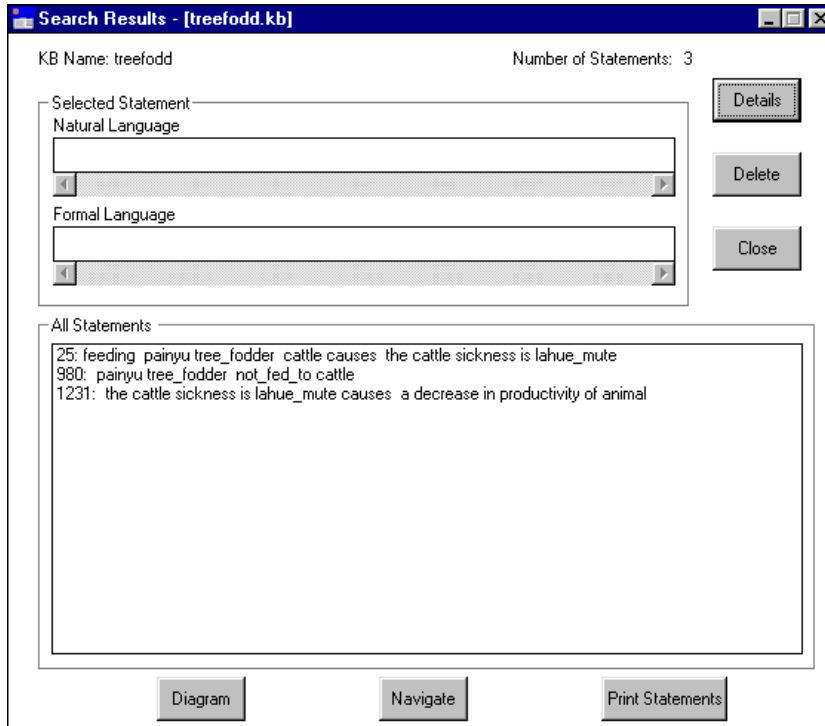


Figure 7.54 'Search Results' for the formal term 'cattle' – screen display after selecting **Show use in statements** in Formal Terms dialog box



Figure 7.55 The message that appears having selected **Show use in hierarchies** in the Formal Term dialog box, with 'cattle' as the formal term

7.7.2 ADDING FORMAL TERMS

It is also possible to add new formal terms, unattached to statements, to the glossaries via **Formal Terms**. This is of particular use for objects and object hierarchies (see 7.5.3).

In order to add new formal terms, press **New**. A 'New Formal Term' dialog box appears (Figure 7.56).

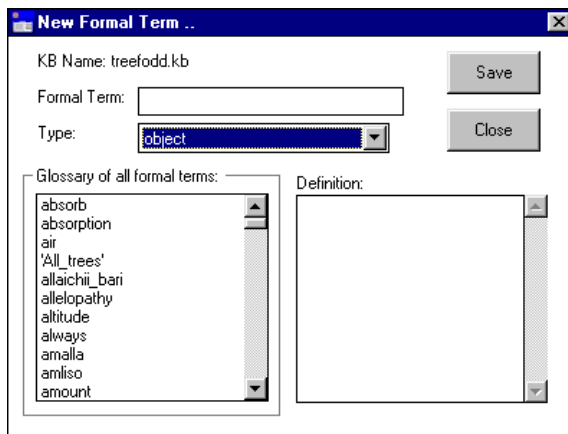
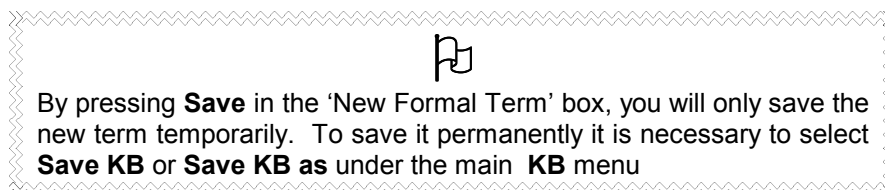


Figure 7.56 'New Formal Term' dialog box

The new 'Formal Term' is typed into the top box. The 'Glossary of all formal terms' exists to enable you to check that the term, or something similar, is not already in the knowledge base. You select the formal term type from the drop-down menu in the 'Type' box. The 'Definition' box enables you to add a precise definition of the term as it is to be understood in the context of the present knowledge base.

When finished, press **Save**. A message will then appear, 'Do you wish to add the formal term to the Kb?' (as it does whenever you introduce a new formal term when you create a new statement). Press **Yes**, whereupon a message appears to confirm that the new term has been saved.

If you attempt to add a term which already exists in the knowledge base, a message appears 'A term with the same name already exists in the kb'.



7.7.3. DELETING FORMAL TERMS

These added terms may also be deleted by highlighting them in the 'Formal Terms' list and selecting **Delete**. However, it is not possible to delete a formal term that still appears in a formal statement. In order to remove a formal term which appears in a formal statement, the term must either be replaced, using the edit function in the **Statements** menu (see above, 7.4.4) or by deleting the statement altogether, using the **Delete** function in the **Statements** menu (see above 7.4.5).

7.8 SYNONYMS

The 'synonyms' option allows you to specify a synonym for a formal term. An example of this might be the local name for a plant beside the common English name and the scientific Latin name. For example, the tree with the common English name 'shea butter tree' has the scientific name *Vitellaria paradoxa*, and is also commonly known in English by its French name 'karité' whilst in the Hausa language in Nigeria it is known as 'ka'danya', in the Bambouk language in Senegal it is known as 'toulou'. Thus a knowledge base developed on the shea butter tree in West Africa would need to record all the common synonyms for the tree.

The synonym could also be for a value such as 'decrease' for 'decline' or a process such as 'furlowing' for 'ploughing'.

The reason it is important to have the synonyms option is that it permits you to draw on all available statements using the formal term or any of its synonyms and prevents accidental exclusion in a topic knowledge base because different terms have been used for the same object/process/value etc.

In order to enter a synonym, select the main **KB** menu and then select **Synonyms**. In the 'Synonyms' dialog box that appears, select **New**. A 'New Synonym' dialog box appears. A list of all the formal terms in the knowledge base appears in the box marked 'Choose Formal Term'. Once you select the formal term type from the drop-down menu, only formal terms of the specified type appear in the 'Choose Formal Term' list. From this list highlight the word you wish to give a synonym and then enter the synonym in the 'New synonym name' box (Figure 7.57). Press **Save**. A message will appear confirming that the new synonym has been saved (Figure 7.58).

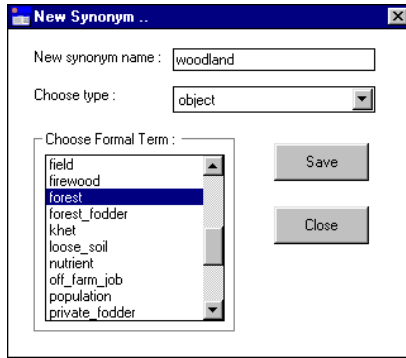


Figure 7.57. Entering a new synonym into the New Synonym dialog box

The screen will then revert back to the 'Synonyms' dialog box, where the new synonym is now listed under 'Synonyms' (Figure 7.59).



Figure 7.58 Message confirming that a new synonym has been saved

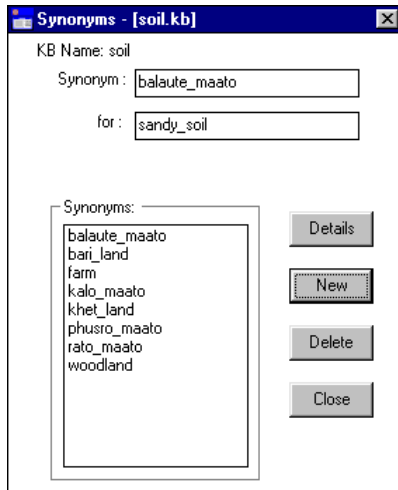



Figure 7.59 The new synonym 'woodland' listed under the list of synonyms


 A new synonym will only be saved permanently in a knowledge base if you save the knowledge base itself by selecting **Save KB** or **Save KB As** from the main KB menu

If you wish to add a definition to the synonym, press **Details**. This will bring you directly to the 'Formal Term Details' dialog box (see above, 7.7.1 and Figure 7.53) where a definition can be added.

If a synonym is no longer appropriate or desired it can be deleted simply by highlighting it in the 'Synonyms' list box and pressing **Delete**. Note however, that if a synonym is already in use as a formal term in the knowledge base (i.e. appears in one of the formal statements), then it is not possible to delete it, and to remove it you must follow the same procedure as removing an unwanted formal term still in use (see above 7.7.3).

7.9 MEMOS

When opening an existing knowledge base, the first dialog box to appear is the Memo dialog box. This Memo dialog box can also be accessed by selecting **Memos** in the main KB menu.

The Memo dialog box should be used as an introduction to the knowledge base. The reason it appears as you open the knowledge base, is to give users, other than the knowledge base developer, an immediate general understanding of the knowledge base, thus facilitating access to and manipulation of that knowledge.

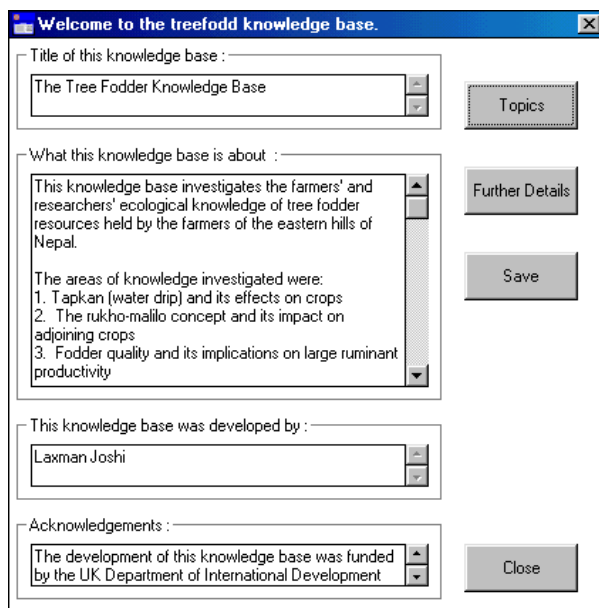


Figure 7.60a The Memo dialog box

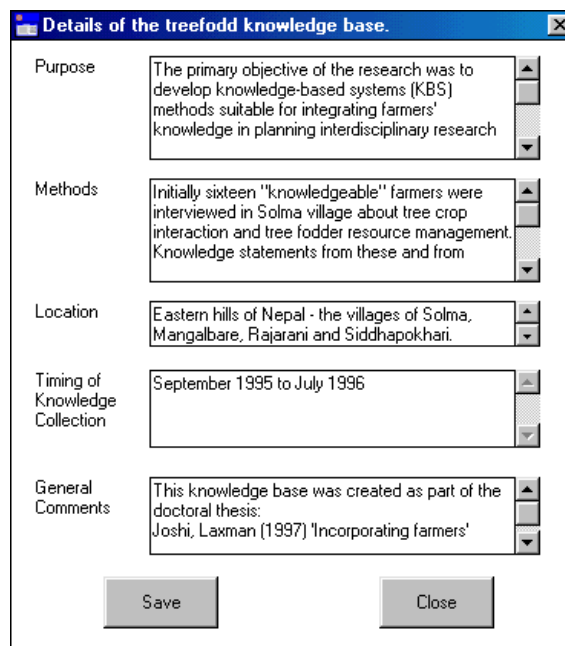


Figure 7.60b The Further Details dialog box


Each section of the memo dialog box (Figure 7.60a) is self explanatory:

- **Title of this knowledge base:** – Here the full title of the knowledge base should appear, for example, the full title of the ‘treefodd’ knowledge base is ‘Tree Fodder and Indigenous Knowledge in Nepal’.
- **What the knowledge base is about:** – Here the area of local knowledge covered by the elicitation process should be described.
- **This knowledge base was developed by:**– Here the name of the knowledge base developer(s) is(are) recorded.
- **Acknowledgements:** here all acknowledgements are listed – to those, other than the developers, who assisted in the design and creation of the knowledge base and to any funding bodies that supported the project.

If you press on **Further Details** another dialog box appears (Figure 7.60b) giving further details of the knowledge base;

- **Purpose** - If the knowledge base was built as part of a particular project, or designed to supplement work in a certain field, this can be recorded here.
- **Methods** – Here information about the methods used for selecting the interviewees and collecting the knowledge may be described.
- **Location** – Here information about the exact location of the communities visited can be recorded.
- **Timing of Knowledge Collection** – The time of year, and the season that the knowledge collection was undertaken, may influence the knowledge elicitation process and should therefore be noted.
- **General Comments** – Here any other pertinent pieces of information may be recorded.

The Memo dialog box also contains a **Topics** button, which, if selected, takes the user directly to the Topic Hierarchies dialog box (7.12 below). This enables the user to have immediate access to the major subjects of interest in the knowledge base.



When you open a knowledge base, the Memo dialog box will be in Read Only format, with the **Save** button deactivated. This is to prevent you inadvertently making changes to the Memo field. To reactivate the Save button, and to make amendments to the Memo field, you must enter it via the **Memos** option in the main **KB** menu.

7.10 SELECTING SUBSETS OF THE KNOWLEDGE BASE

AKT enables the user to extract subsets of a knowledge base according to user-specified search criteria. Often, this selection of subsets of the knowledge base may be a part of the process of evaluating and using the knowledge base.

7.10.1 THE BOOLEAN SEARCH

The **Boolean Search** offers a search criterium for creating subsets of knowledge. You can search for individual keywords, formal terms or sources. It is also possible to link any of these together using **and** and/or **or**, or even whole hierarchies or subsets of hierarchies, and then search for these. It is also possible to carry out a search combining formal terms with sources.



For demonstrating the functions available in the Boolean Search, we have used the knowledge base 'soil'.

A Boolean search is carried out by selecting **Boolean Search** under the main **KB**. A 'Boolean search' dialog box appears (Figure 7.61).

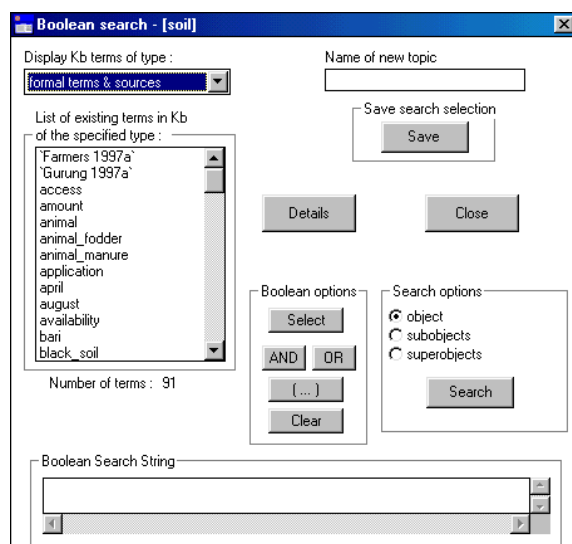


Figure 7.61 The 'Boolean Search' dialog box

The 'Display KB terms of type' box will give you the option of selecting one of the seven formal term types as well as sources, synonyms and topics. Highlight the type required. The 'List of existing terms in KB of the specified type' below will display all the terms under that type.

To conduct a Boolean search, highlight the term you wish to incorporate from the 'List of existing terms in KB of the specified type' box and press **Select** from the 'Boolean options' box. The chosen word will appear in the 'Boolean Search String' box at the bottom of the dialog box. The search is carried out by pressing **Search** in the 'Search options'.

7.10.1.a The use of 'and' and 'or'.

Further terms can be added to a Boolean Search String by clicking on **and** or **or** and then highlighting the next term and pressing **Select** again. The option **and** narrows a search by limiting the search to only those statements that contain all the terms selected. The option **or** broadens the search by including all statements that contain one or more of the formal terms selected.

7.10.1.b The use of brackets

If you use both **and** and **or** in your Boolean Search String, you must use brackets to construct the arguments logically, as one would in algebra. Using the knowledge base 'soil' imagine you wished to conduct a search which gave you all statements about degradation and soil and all the statements about erosion and soil. To do this you would use brackets in the Boolean Search String in the following way:

(degradation **and** soil) **or** (erosion **and** soil) (Figure 7.62)

7.10.1.c Studying the 'search results' using 'Diagram Selection Type'

Once you have formulated the Boolean Search String and pressed **Search**, the resulting pop-up menu, the 'Search Results', displays all the statements found by the search (Figure 7.63).

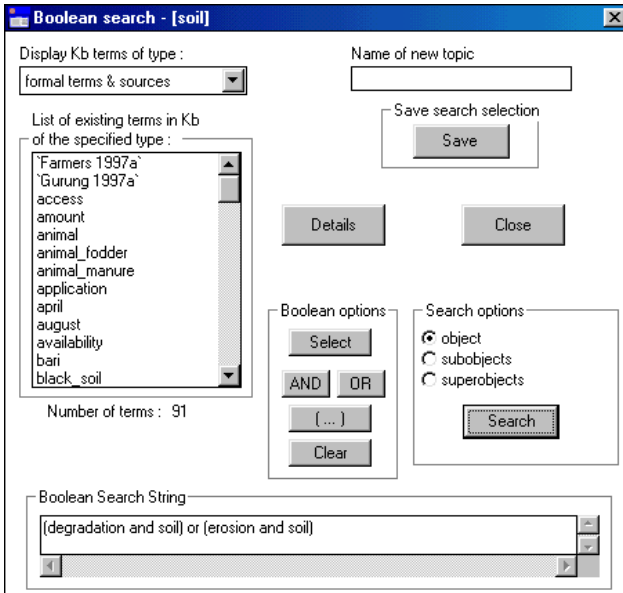


Figure 7.62 Carrying out a Boolean Search in 'soil'

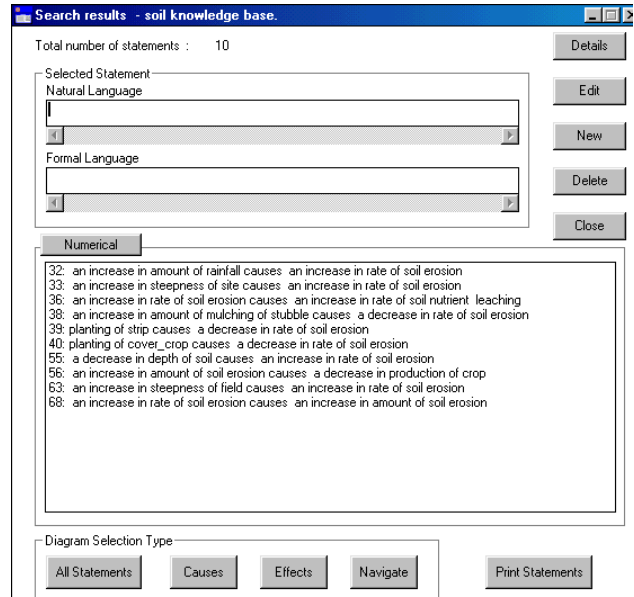


Figure 7.63 Search results from the Boolean Search in Figure 7.62

If you press **Diagram** in the 'Search Results' dialog box, a diagram of all the statements from that search, which can be diagrammatically represented, appears (Figure 7.64). (See Chapter 8 for further details about the diagramming interface).

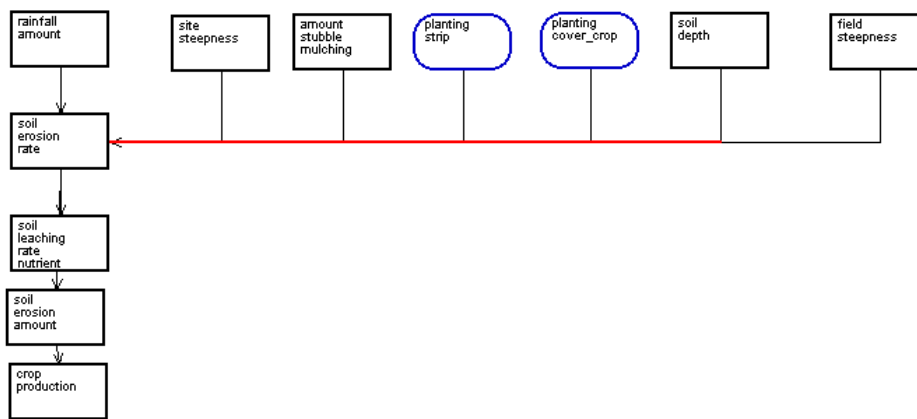


Figure 7.64 The diagrammatic representation of the Search Results in Figure 7.63

It is also possible to highlight any one of the statements in the ‘Search Results’ and then click on **Navigate**. This option will give you all the *immediate* causes and effects associated with that particular statement. Figure 7.65 gives a diagrammatic representation of all the nodes immediately associated with statement no.32 in the ‘Search Results’ (see Figure 7.63 above) - ‘an increase in amount of rainfall causes an increase in rate of soil erosion’.

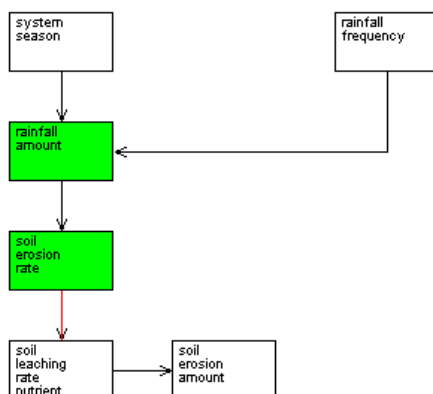


Figure 7.65a The diagrammatic representation of all the causal statements immediately connected to Statement No.32 ‘an increase in the amount of rainfall causes an increase in the amount of soil erosion.’

By selecting **Statements** on the left-hand side of the Diagram screen (see Chapter 8), you will get a full list of the statements incorporated into the diagram (Figure 7.65b)

5 of the 73 knowledge base statements are represented in this diagram.

<p>32: an increase in amount of rainfall causes: an increase in rate of soil erosion</p> <p>36: an increase in rate of soil erosion causes: an increase in rate of soil nutrient leaching</p> <p>57: the system season is winter causes: the amount of rainfall is low</p> <p>65: a decrease in frequency of rainfall causes: a decrease in amount of rainfall</p> <p>68: an increase in rate of soil erosion causes: an increase in amount of soil erosion</p>

Figure 7.65b Statements incorporated in the diagram in Figure 7.65a

It is also possible to use the **Causes** and **Effects** buttons. In the following example we have highlighted the same statement as above, statement no. 32 ‘an increase in amount of rainfall causes an increase in rate of soil erosion’ and then pressed **Causes**. The diagram in Figure 7.66a depicts the causes that flow *into* statement no.32 and Figure 7.66b presents them in list form.

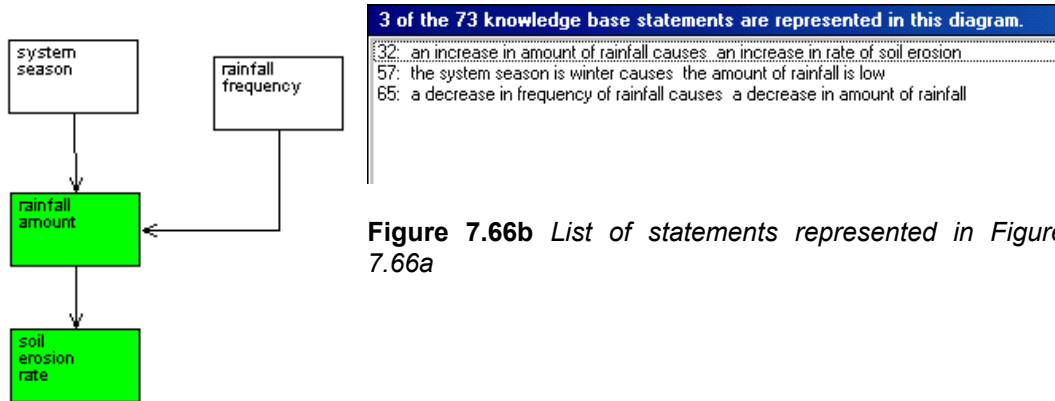


Figure 7.66b List of statements represented in Figure 7.66a

Figure 7.66a Causal flow into Statement No.32

Using the same statement no. 32 once more we pressed **Effects**. Figure 7.66c is a diagram of all the effects flowing *from* the statement no. 32 and Figure 7.66d presents them in list form.

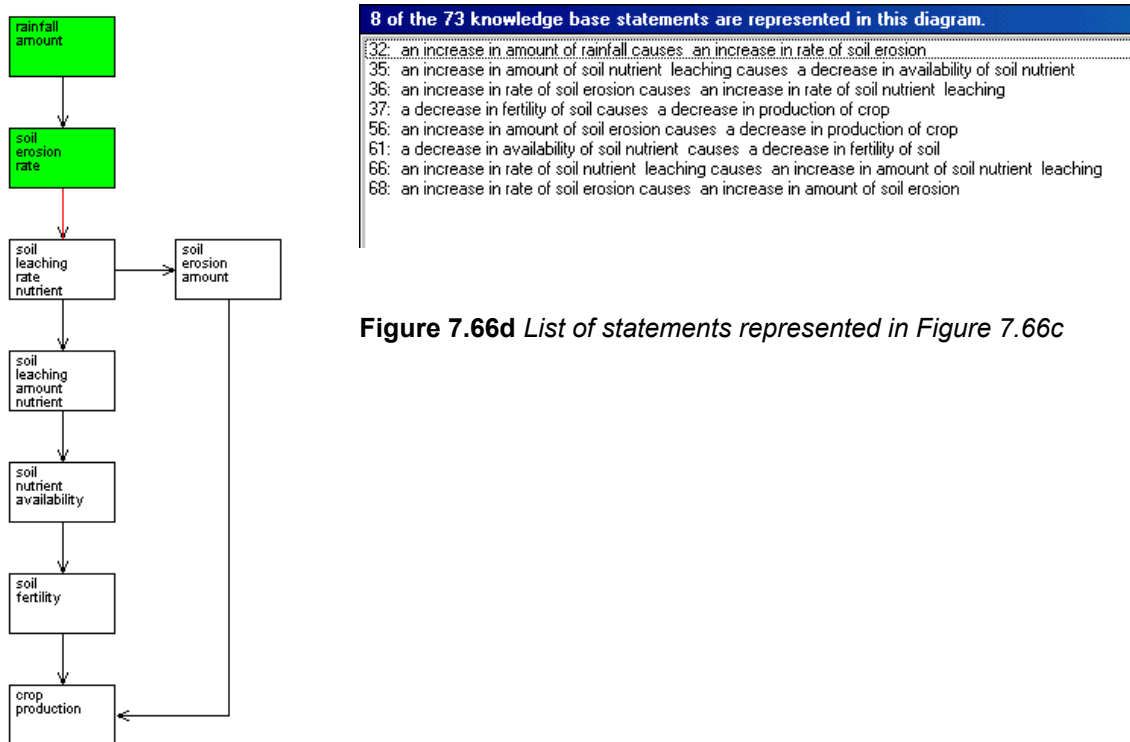


Figure 7.66d List of statements represented in Figure 7.66c

Figure 7.66c Causal flow out of statement no. 32



To summarize 'Diagram Selection Type'

All Statements– gives you a diagram of all the statements extracted by the Boolean Search which can be presented in diagrammatic form (i.e. causal and link statements)

Causes – gives you a diagram of *all* the causes of one statement selected from the statements extracted by the Boolean Search.

Effects – gives you a diagram of all the effects of one statement selected from the statements extracted by the Boolean Search.

Navigate – gives you a diagram of all the *immediate* causes and effects of one statement selected from the statements extracted by the Boolean Search.

7.10.2 USING THE BOOLEAN SEARCH ON OBJECT HIERARCHIES

For the objects amongst the formal terms selected in the 'Boolean Search String', a choice of search modes is available in the 'Search options' box; 'object', 'subobject' and 'superobject' (see above, Figure 7.62). By highlighting one or more of these options there are 7 possible combinations for the Boolean search. For example 'object' alone recognises only those statements in which the object selected is actually used; 'object' plus 'subobject' extracts unitary statements in which either the specified object or the children and descendants of that object in the object hierarchy are used; and 'object' plus 'subobject' plus 'superobject' extracts unitary statements in which either the specified object, its children and descendants, its parent, or ancestors all the way up the hierarchy tree, are used.

The collection of statements displayed as a result of a Boolean Search will assist in the interactive evaluation of the knowledge base contents, but it is worth noting that all of these search facilities can be invoked by one or more of the primitive tools (see chapter 9).

7.11 TOPICS

7.11.1. CREATING A TOPIC

It is possible to save any combination of search criteria to gather all the information about a particular topic within a knowledge base. To create a topic, first select your search criteria for the Boolean Search String, as described above (7.10.1). Then enter a topic name in the 'Name of new topic' box in the 'Boolean Search' dialog box (Figure 7.67) and press **Save**. The ensuing menu, 'Topic details' will permit you to add a description of the topic (Figure 7.68).

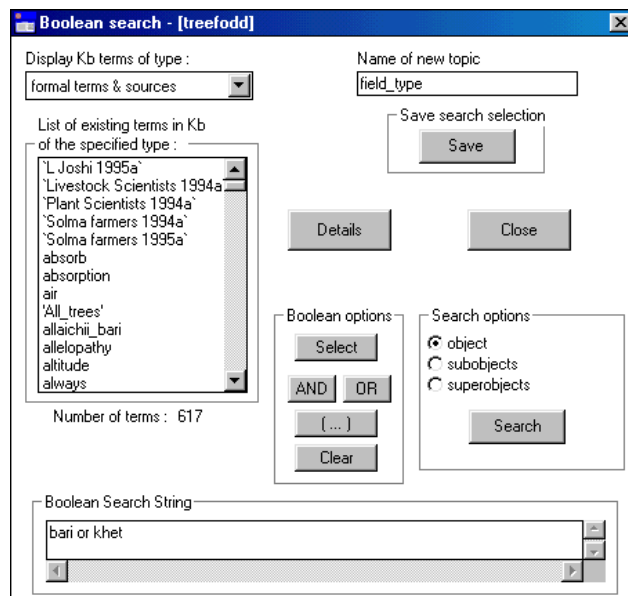


Figure 7.67 Creating a topic

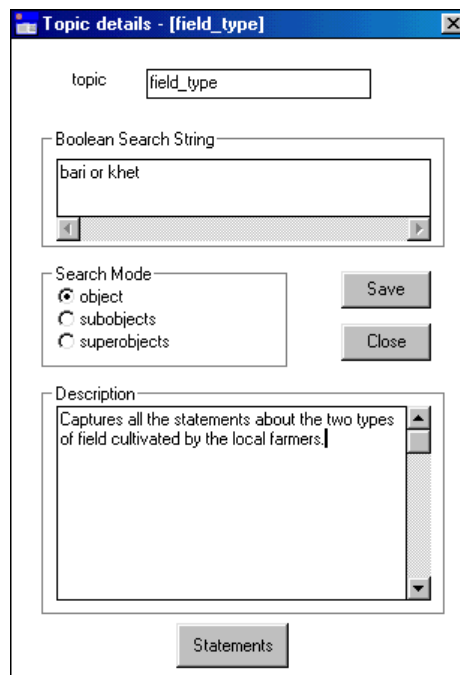


Figure 7.68 Filling in the 'Topic details' dialog box

If the search string incorporates hierarchic objects then the 'Search Mode' will allow you to specify further search criteria. Once you have filled in all the details, press **Save**. A message will appear (Figure 7.69) confirming that the topic has been saved.

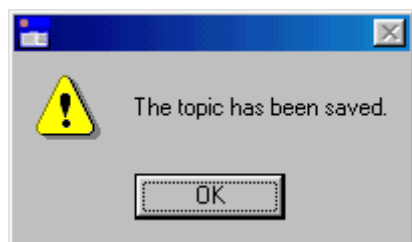


Figure 7.69 Message confirming that a new topic has been saved

Once you have pressed **OK** the screen reverts back to the 'Boolean Search' dialog box.

7.11.2 MANAGING TOPICS

To manage topics already created, it is necessary to select **Topics** from the main **KB** menu. The following dialog box then appears (Figure 7.70);

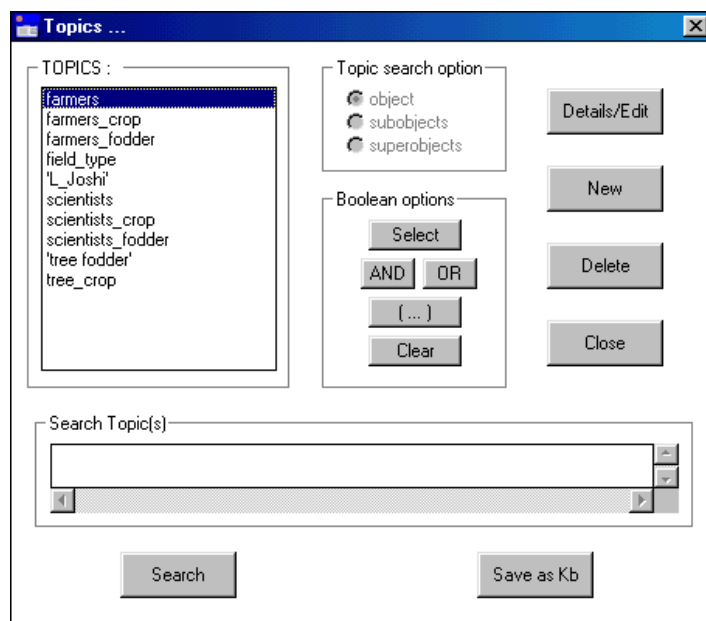


Figure 7.70 Topics dialog box

To see the details of a topic or to edit a topic, highlight the topic and press **Details/Edit**. This will bring up the 'topic details' box (see above 7.11.1 and Figure 7.68) which gives the Boolean Search String it uses, the search mode for objects and a description of the topic. If you wish to amend the details, it can be done from this dialog box, pressing **Save** when the amendments are complete. If you just wish to view the details, press **Close** when you have finished.

It is also possible to create a new topic by selecting **New**. If you select **New** the 'Boolean Search' dialog appears as above (see 7.10.1). To see the statements attached to a topic highlight the topic in the 'Topics' box, press **Select** so that the topic appears in the 'Search Topic(s)' box and then press **Search**. This brings up the 'Search Results' dialog box listing all the statements captured by that topic.

If you wish to delete a topic, you must first highlight the topic in the 'Topics' list and then press **Delete**. A message will then appear to confirm whether you want to delete the topic (Figure 7.71). Press **Yes** to confirm.

7.11.3 USING TOPICS

It is possible to search for several topics at a time. If you wish to see statements of more than one topic, highlight the desired topics one at a time, press **Select** and then press **or** before adding another topic to the 'Boolean Search String'. If you wish to find only the statements which appear in two or more topics, use **and** to link the topics.

The 'Topic Search Option' box shows what combination of object, subobjects and superobjects was used to create the topic. This *cannot* be altered from within the 'Topics' dialog box. To alter the combination, you must press **Details/Edit** and revert to the 'Boolean Search' dialog box and alter it there.

Figure 7.72 is an example of combining two topics using **OR**. The two topics chosen were SoilColour and SoilTexture. The 'Boolean Search String' at the bottom of the dialog box gives the two topic names chosen. Once the selection is made, press **Search** and the 'Search Results' dialog box appears (Figure 7.73).

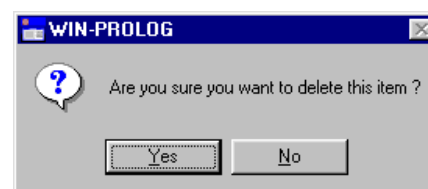


Figure 7.71 Message to confirm that the alias is to be deleted

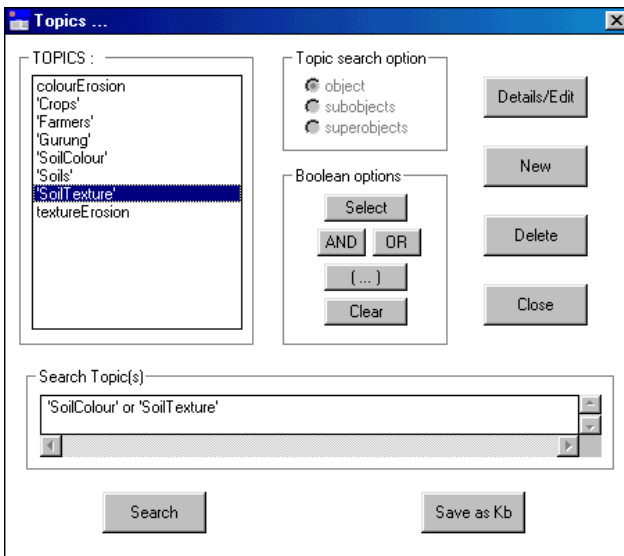


Figure 7.72 Boolean Search String for two topics combined, SoilColour and SoilTexture

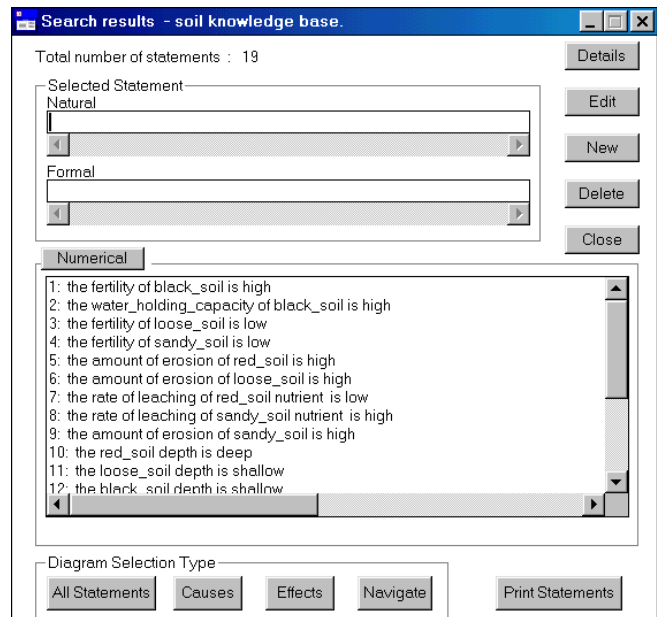


Figure 7.73 The 'Search Results' dialog box for the Boolean Search String in Figure 7.69

7.11.4 CREATING A NEW KNOWLEDGE BASE OUT OF A TOPIC

It is also possible to convert a topic, or a string of topics into a new knowledge base. This option is of use if the original knowledge base has become too large and unwieldy, or if so much information exists on a specific topic that it justifies creating a new, separate knowledge base. It may also be the case when a knowledge base is to be divided up between researchers, each with a separate remit, to study one particular aspect of the mother knowledge base.

In order to do this, highlight the topics you wish to incorporate into the new knowledge base - for this reason it is possible to highlight several topics at once. Then press **Save as KB**. This brings you to the 'Name of new KB' dialog box (Figure 7.74) where you can save the topics as a knowledge base under a new name and under a new folder/directory if necessary.

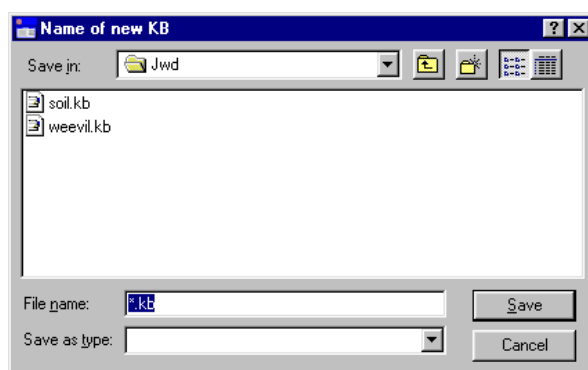


Figure 7.74 'Name of new KB' dialog box

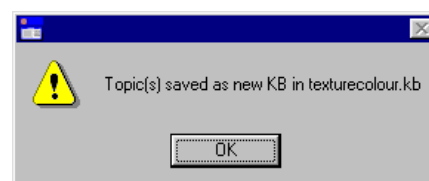



Figure 7.75 Message to confirm that the topics have been saved as a new knowledge base

Once you have entered a name for the new knowledge base and pressed **Save**, the screen reverts to the original knowledge base and a message appears that the topics have been saved as a new knowledge base (Figure 7.75).



Points to watch when converting a topic into a separate knowledge base

When you convert a topic or group of topics into a new knowledge base the new knowledge base will contain all the sources and all the object hierarchies and topic hierarchies which appeared in the original knowledge base. Only the formal terms that appear in the statements transferred to the new knowledge base and any object formal terms used by any of the hierarchies, will appear in the Formal Terms list.

Before embarking upon expanding the new knowledge base it would be wise to check rigorously whether all the sources, terms and hierarchies inherited from the original knowledge base are relevant to the new knowledge base. Certain elements may need to be removed to avoid confusion and to uphold the principle of parsimony.

7.12 TOPIC HIERARCHIES

As one can have object hierarchies, so one can create topic hierarchies. A single knowledge base may contain a number of discrete topic hierarchies and a single topic may appear in more than one hierarchy. When you first open your knowledge base the 'Topic Hierarchies' dialog box can be accessed directly via the Welcome Memo by pressing the **Topics** button. This is to give the user an idea of what topics are covered by the knowledge base. If you wish to return to it later, you enter **Topic Hierarchies** via the main **KB** menu.

7.12.1 VIEWING TOPIC HIERARCHIES

In order to view a topic hierarchy, enter **Topic Hierarchies** via the main **KB** menu. The 'Topic Hierarchies' dialog box appears listing the topic hierarchies that exist. If you highlight one of the topic hierarchies, the 'Topics in selected hierarchy' box produces a list of topics within the topic hierarchy (Figure 7.76).

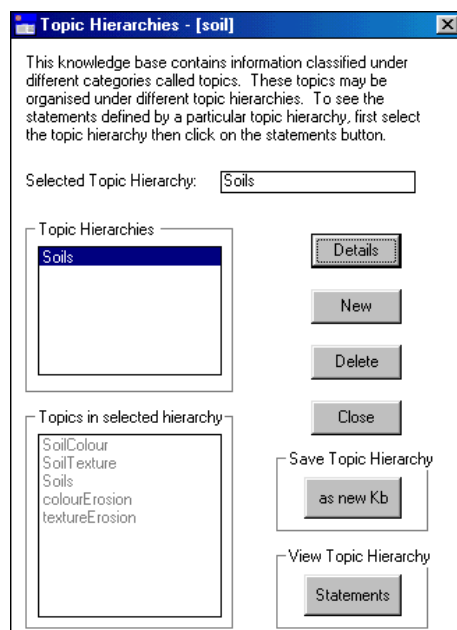


Figure 7.76 'Topic Hierarchies' dialog box

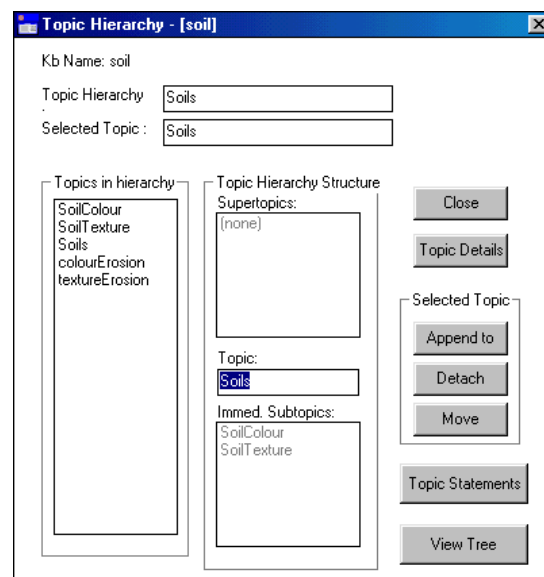


Figure 7.77 'Topic Hierarchy' dialog box

The relevant 'Topic Hierarchy' dialog box (Figure 7.77) appears automatically when you highlight a topic hierarchy in the 'Topic Hierarchies' dialog box and is very similar to the 'Object Hierarchy' dialog box explained above (see 7.5.2 and compare with Figure 7.29).

The **Topic Details** allows you to see the 'Topic Details' dialog box giving the Boolean Search String that made up the topic hierarchy, the search mode for objects and any description that might have been written on the topic hierarchy.

Topic Statements allows you to see and browse all the statements encompassed in the topic hierarchy. **View Tree** allows you to see the structure of the topic hierarchy.

7.12.2 CREATING TOPIC HIERARCHIES

In order to create a new topic hierarchy, select **New** in the 'Topic Hierarchies' dialog box (see above, Figure 7.76). A 'New Topic Hierarchy' dialog box appears (Figure 7.78).

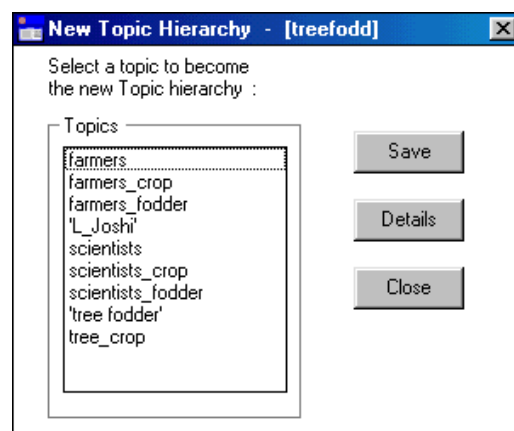


Figure 7.78 'New Topic Hierarchy' dialog box

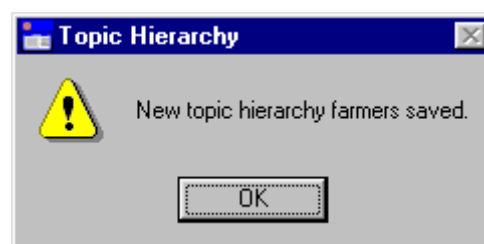


Figure 7.79 Message confirming that a new topic hierarchy has been saved

Unlike Object Hierarchies where it is possible to create a new name for the hierarchy, the name of the new Topic Hierarchy must come from one of the topics already created. Highlight the chosen topic in the 'Topics' box. If you want to make sure how the topic was originally defined, (i.e. the Boolean Search String used), select **Details**. After checking the details, press **Save**. A message will appear, confirming that a new topic hierarchy has been saved (figure 7.79) and the topic name will now appear in the 'Topic Hierarchies' list of the 'Topic Hierarchies' dialog box (Figure 7.80).

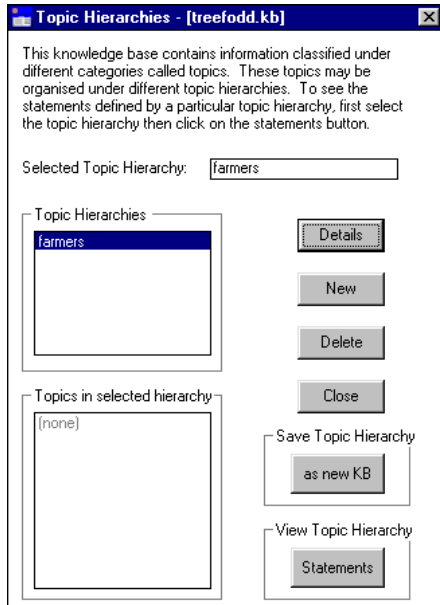


Figure 7.80 The new topic hierarchy appearing in the 'Topic Hierarchies' list box

To view all the statements, which form part of the topic hierarchy, select **Statements**. This will bring up a 'Search Results' dialog box with all the statements in the topic hierarchy listed in natural language.

To delete a topic hierarchy, highlight the relevant one and press **Delete**. A message will appear confirming that the topic hierarchy has been deleted.

7.12.3 APPENDING TOPICS TO A TOPIC HIERARCHY

In order to append topics to a topic hierarchy, highlight the chosen topic hierarchy in the 'Topic Hierarchies' dialog box. In the new dialog box 'Topic Hierarchy', select **Append**. An 'Append Topic' dialog box will appear (Figure 7.81)

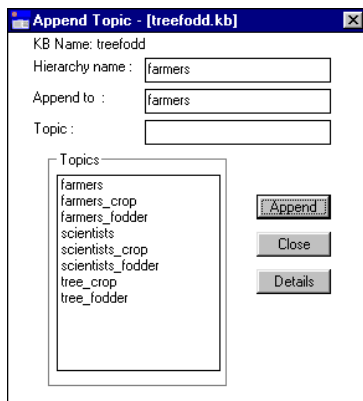


Figure 7.82 Message confirming that the topic has been appended to the topic hierarchy

Figure 7.81 'Append Topic' dialog box

Select the chosen topic to be appended and press **Append**. A message will appear confirming that the topic has been appended to the topic hierarchy (Figure 7.82). In the example used here, a topic hierarchy 'Farmers' was created in the 'treefodd' knowledge base, to which the topics 'farmers_crop' and 'farmers_fodder' were appended. The 'Topic Hierarchy' dialog box gives the structure of the hierarchy (Figure 7.83).

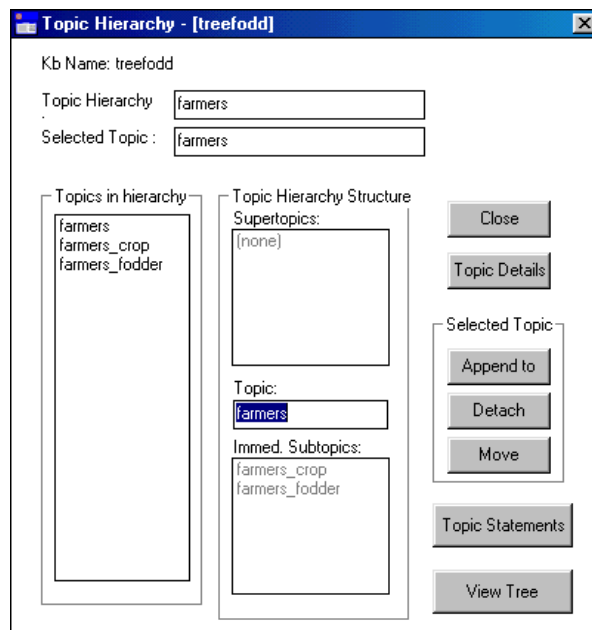


Figure 7.83 The subtopics 'farmers_crop' and 'farmers_fodder' appended to the topic hierarchy 'farmer'

Topics can *only* be appended to a topic hierarchy if they are a subset of that topic hierarchy. In other words their 'Boolean Search String' can only contain formal terms/sources also included in the topic hierarchy. In this case 'farmers_crop' and 'farmers_fodder' are both subsets of 'farmers'.

If you attempt to append a topic with a 'Boolean Search String' which is not a subset of that of the super-topic, for instance, if we try to append 'scientists' as a sub-topic of 'farmers', a message will appear warning you that the topic is not a subset of the super-topic (Figure 7.84).

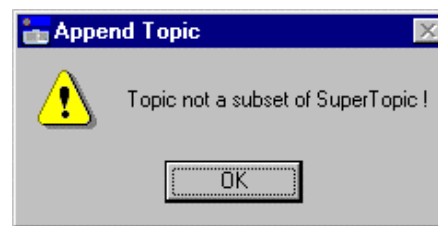


Figure 7.84 Message appearing when it is not possible to append a topic to a topic hierarchy.

7.12.4 CREATING A NEW KNOWLEDGE BASE OUT OF A TOPIC HIERARCHY

Just as one can save a topic as a new knowledge base, it is also possible to save a topic hierarchy as a new knowledge base. In order to do so, highlight the topic hierarchy in question in the 'Topic Hierarchies' dialog box, and select **as new KB** from the 'Save Topic Hierarchy' box. The procedure is then identical to that of saving a topic as a new knowledge base (see above 7.11.4).

7.13 PRINTING AND SAVING SEARCH RESULTS

In many cases it may be desirable to print out or to save search results made via the **Formal Terms** or **Boolean Search** dialog boxes. In order to do so, press **Print Statements** at the bottom of the 'Search Results' dialog box (Figure 7.85). A message appears (Figure 7.86) asking whether you wish to save the output to a text file.

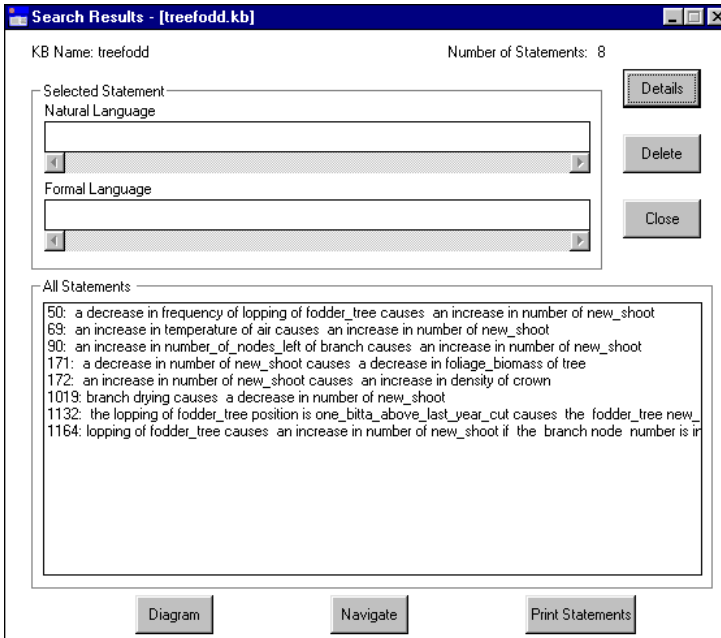


Figure 7.85 'Search Results' dialog box for the formal term 'new_shoot'

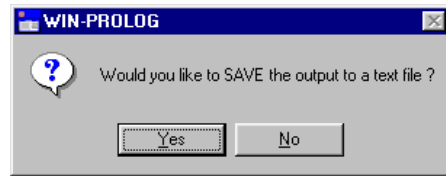


Figure 7.86 Message which appears when you select **Print Statements**

If you select **Yes** then the following 'Save output in file' screen will appear (Figure 7.87);

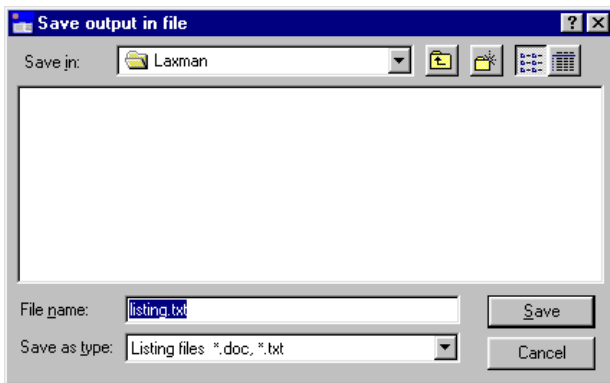


Figure 7.87 Saving the Search Results statements to a file

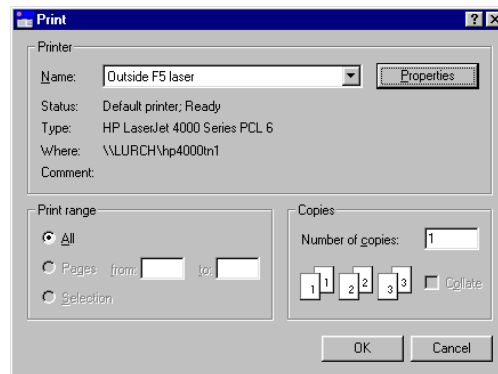


Figure 7.88 'Print' dialog box

This allows you to save the text as a text file in a directory and folder of your choice. Once you have named the file and saved it in the correct place, press **Save**.

If you decide not to save the file and press **No** in Figure 7.86 above, the printer details dialog box will appear, allowing you to change its properties before printing.

7.13.1 PRINTING IN LANDSCAPE

If the statements are particularly long, it may be better to print out the statements in landscape. In order to do so, select **Properties** and then **Basics** from the printer details dialog box (Figure 7.89) and select the **Landscape** radio button under 'Orientation'. Then press **OK**. This will return you to the 'Print' dialog box as above (Figure 7.88).

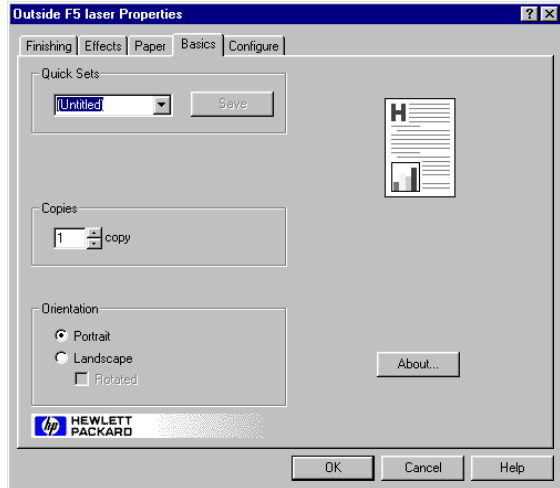


Figure 7.89 Selecting the Landscape option in print 'Properties'

7.14 SAVING A KNOWLEDGE BASE

7.14a Saving a knowledge base on the hard drive

If you wish to save any additions or alterations to a knowledge base you have made since creating it or opening it, you must always select **Save KB** before you close the knowledge base down by selecting **Close KB**.

7.14b Saving a knowledge base to a floppy disk or a cd

If you wish to save a knowledge base to a floppy disk or cd, *do not* save it directly to the disk because it will take a very long time. Save it to the hard drive first and then, using Windows Explorer, select the saved file, press **Ctrl c**, open the floppy disk drive / cd drive and press **Ctrl v**.

7.14c Saving the knowledge base under a different name

If you want to change the name of a knowledge base, or create two versions of a knowledge base, then before closing the knowledge base you should select **Save KB As**. This allows you to rename the knowledge base and retain the original version, by giving the most recent version a new name, or to save the knowledge base in another folder or directory.

WARNING

If you decide to change or edit the name of any knowledge base, it must only be done from *within* AKT via the **Save KB As** option. If it is done any other way then AKT will not be able to load the knowledge base correctly.

7.15 MOVING FROM ONE KNOWLEDGE BASE TO ANOTHER

It is possible to load more than one knowledge base onto the program at a time. The advantage of this is that it enables you to switch quickly from one knowledge base to another, without exiting the program, something which is of particular value when running the tools (see Chapter 9).

In order to load the knowledge bases onto the program, simply select **Open KB** from the main KB menu, and then choose the knowledge base you want. You load the knowledge bases one at a time, selecting **Open KB** each time. The most recent knowledge base to be loaded will be the one that appears on the screen. To move from one knowledge base to the other select **Select KB** from the main **KB** menu. The following dialog box appears (Figure 7.90).

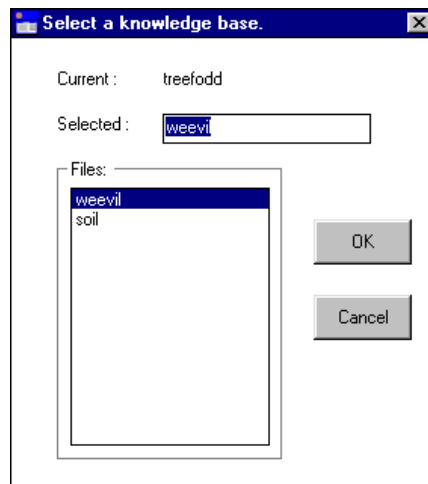


Figure 7.90 *Moving from one knowledge base to another.*

In this example the current knowledge base is 'treefodd'. The other two knowledge bases loaded, 'weevil' and 'soil', appear in the 'Files' list. To change the current knowledge base, highlight one of the knowledge bases in the 'Files' list and press **OK**. The selected knowledge base will now automatically become the current knowledge base.

