

A Quick Sightseeing Tour Around AKT5 version 5.24

Using the Atwima knowledge base
developed in Ghana, 2003

This quick tour around AKT with the **Atwima knowledge base** is designed to familiarise you with the AKT software and with ways of manipulating knowledge bases.

Getting started:

- Go into the **AKT5 Software** folder and install AKT5 version 5.24 onto your computer by double clicking on the icon.
- Open AKT5 and then open the **atwima.kb** by selecting **KB** on the tool bar at the top of the page, click on **Open Kb...** then select the atwima kb from **the saved location of the Ghana kbs** and click on **Open**.

Welcome Dialog Box

Read the Welcome dialog box to get an idea of what the knowledge base is about. Click on Pictures/Diagrams. Read the text at the top and then view each picture by clicking on it. When you have finished with each picture/diagram, click on the X in the top right corner to close the dialog box. The diagrams provide background information about the livelihoods of the farmers who participated in the research. Click on the X in the top right corner to return to the Welcome screen.

Now, let's look at Topics by clicking on the Topics button in the Welcome memo.

Topic hierarchies

Topics are ways of organising information for particular subject areas e.g. 'Fallow length' or 'Weed management'. In **topic hierarchies** specific subject areas are arranged under a more general subject heading e.g. 'Fallow length', 'Fallow management' and 'Fallows and soil types' all fall under the general topic hierarchy of 'Fallows'.

On the left you can see a list of the topic hierarchies in the knowledge base. Highlight 'Soil types'. In this topic hierarchy dialog box, you will see a column containing a list of all the topics in this topic hierarchy, and to the right of this you will see 'Soil types' highlighted in blue with all its subtopics immediately below it.

Click on **View Tree** and scroll down the page. This shows you the full topic hierarchy. Click on **X** to close the box. Select 'Red soil in the 'Topics in hierarchy' list. You will see that it now appears in the 'Topic' box with 'Soil types' specified as the supertopic above it and 'Fallows on red soil' and 'Fertility of red soil' specified as the subtopics below it.

Highlight in turn each topic hierarchy listed in the Topic Hierarchies dialog box (on the left hand side of the screen).

Question: What topics are shown to be in the topic hierarchy 'Weeds'?

Press the **X** on both dialog boxes to close them and return to the Welcome Memo and **X** again to arrive at the main menu.

Sources

Go to the main menu (top left) and select **KB** → **Sources...**

Sources tell you the origin of a statement. All statements have a source, which can be of 2 types: an interview with a person e.g. a farmer or scientist, or a reference e.g. a journal reference.

On the left is a list of all the sources interviewed for the knowledge base. Let us look at one of them. Highlight the name 'Asmoah et al Kyereyase 2000a' and press **Details**.

A dialog box appears giving you the name of the person interviewed, the interviewer and date of interview. You are also given the gender, age and ethnic origin of the interviewees and a location which is their town of residence.

If you press **Memo**, you will be given any further details that the creator of the knowledge base deemed important. Now **Close** all three dialog boxes

Topics

From the main menu select **KB** → **Topics...**

This gives you a list of all the topics in the knowledge base. Highlight **'Management actions'** and press **Details/Edit**. In the dialog box that appears you will see in the 'Boolean Search String' how the topic was created – it is a search for any of the following action words – 'burning', 'clearing', 'cutting', 'harvesting', 'planting', 'uprooting', 'use', 'work'.

Click on **Show use in statements** at the bottom of the dialog box and a list of all the statements on management actions will appear. There are 107 statements in all. As you scroll through the list of statements you will notice that the translation does not sound like a natural use of English – this is illustrated and explained in the diagrams section on the next page.

Close the list of statements and the topic details.

Topics continued

All knowledge in the knowledge base is represented by *statements* – we call these the **basic units** of the knowledge base. There are 4 different types of statement. ***Attribute statements*** tell you about the properties (attributes) of something – they are descriptive. ***Causal statements*** give you information about cause and effect relationships. ***Comparison statements*** compare the properties of two objects. ***Link statements*** represent the connections between objects that cannot easily be represented using the other statement types.

Now try the same thing with the topic **‘Weed control’**.

Question: How many statements are there on weed control?

Close all open dialogboxes and return to the main menu.

Object Hierarchies

From the main menu select **KB** → **Object Hierarchies...**

What we refer to as **objects** are words used to refer to material or conceptual things e.g. pests, soil, cows, policy, household. **Object hierarchies** are another way of sorting knowledge by arranging specific objects under more general objects e.g. *esa*, *funtum* and *onyina* are all types of tree. Therefore, *esa*, *onyina* and *funtum* are all subobjects of the object 'trees'. 'Trees' is, then, a superobject of the objects *esa*, *onyina* and *funtum*. Object hierarchies are similar in structure to topic hierarchies.

On the left you can see a list of the object hierarchies in the knowledge base. Highlight 'trees'. On the right you will see a long column containing a list of all the objects in the hierarchy, to the right of this you will see 'trees' highlighted in blue and immediately below all the subobjects under it.

Object Hierarchies continued

Click on **View Tree** and scroll down the page. This shows you the full object hierarchy of trees.

Click on **Close**.

Now select 'timber tree' in the 'Objects in Hierarchy' list. You will see that it now appears in the 'Object' box with 'trees' specified as the superobject above it and odum, okoro, opam, wawa specified as the subobjects below it.

Now **Close** all dialog boxes.

Formal Terms

Go to the main menu and select **KB** → **Formal Terms...**

Formal terms are the key components of statements. **Objects** are one type of formal term. Other types include **actions** – activities with a human agent e.g. harvesting or planting, and **processes** – activities without a human agent e.g. decomposition or germination. You will notice that underscores e.g. `asase_tuntum`, are used instead of spaces in the AKT program. Words which require a capital letter are put in brackets e.g. 'Chromolaena odorata'.

Click on the dropdown 'Type' menu to see the different types of formal terms. Select **object**. All the objects in the knowledge base are now listed. Scroll down and get an idea of the objects in the knowledge base. Highlight **asase_tuntum** and press **Details**. This tells you what `asase_tuntum` is – black soil.

Press **Show use in hierarchies**. You will see that `asase_tuntum` appears in the object hierarchy soil. Press **OK**.

Press **Show use in statements**. The 5 statements that appear are all the statements in the knowledge base that mention `asase_tuntum`. Under 'Diagram Selection Type' at the bottom of the dialog box press **All Statements**.

Introduction to diagrams

The diagram that is generated will show you all the statements containing `asase_tuntum` that can be represented diagrammatically (causal and link statements).

Diagrams are a way of representing statements. However only causal and link statements can be represented on a diagram. One statement is represented by two **nodes** (a rectangular or oval box) connected by an arrow. The different colours and shapes of the boxes indicate different types of node – action, process, object and attribute nodes. The words written within the nodes are the key terms used in the statement.

Press the **Label Mode** button twice. This gives you the statements written on the diagram in full. You can make the statements more legible by dragging the nodes across the screen to separate them out. By putting the Label Mode into ‘manual’ mode, you can also move the statements themselves to make it easier to read.

Question: What is the effect of cropping `asase_tuntum` for 6 years?

To find out what is meant by `cassava_mix`, click on the **Statements** button on the right to get a list of all the statements represented on the diagram. Then select statement 93 and click on **Details**. At the top of the dialog box you will see the natural language statement and at the bottom its formal language equivalent. Now click on **Formal Terms**, select ‘`cassava_mix`’ and click on **Details**. An explanation is given here.

Close all the dialog boxes and return to the diagram.

Introduction to diagrams continued

Statements are typed into the knowledge base as **formal language statements** using a formal grammar (like a code) specific to AKT. These are then translated by the AKT program into stylised **natural language** equivalents that are easier to understand by the user. This use of computer generated translation explains why some statements in the knowledge base do not sound like natural English use.

When working with complex diagrams it is helpful to remember to switch the label mode off. Turn the label mode off now by clicking once more on **Label Mode**. Click on **Step** on the right hand side of the screen and then click on the node, 'fallow length'. (The Step button gives you the immediate causes and effects of each node). 'Fallow length' will be highlighted in green and some additional nodes will appear connected to 'fallow length'. Carefully drag sideways all new nodes to reveal any further nodes underneath (by pressing the left hand mouse button over the node and dragging the node away). The red lines indicate that there is more than one line or arrow on top of one another. Click the **Step** button again and click on 'soil cocoa_suitability'. More nodes appear. Continue to build up the diagram by selecting **Step** each time and clicking on one of the new nodes.

When you have finished, go to the main menu (top left hand corner) and select **Diagram** → **Hide Diagrams**.

Boolean Search

Go to the main toolbar at the top of the page. Select **KB** → **Boolean Search**. Go to 'Display knowledge base terms of the type' and click on the dropdown menu to select 'object'. Select 'asase_kokoo'. Press **Details** to see the term's synonym and then press **Close** on the Formal Term Details dialog box.

Now press **Select** and 'asase_kokoo' will appear in the Boolean Search String at the bottom of the dialog box. Then press the **AND** button. Highlight 'asase_tuntum' and press **Select** once more. (If you want to check the synonym for 'asase_tuntum', press **Details**.) Press **Search**. Two statements will appear. These are the only statements in the knowledge base which include both 'asase_kokoo' **and** 'asase_tuntum'.

In the Search Results dialog box click on the X in the top right corner. In the Boolean Search dialog box press **Clear**. Now do the same thing again, selecting 'asase_kokoo' and 'asase_tuntum', only this time using **OR** instead of AND. Press **Search**.

Boolean Search continued

Now you have 30 statements. This is because you have selected all the statements that include *either* 'asase_kokoo' or 'asase_tuntum'.

In the Search Results dialog box click on the X in the top right corner. Now keep 'asase_kokoo or asase_tuntum' in the Boolean Search String but this time select '**superobjects**' in addition to '**object**' in the 'Search Options' box so that it is highlighted in the same manner as 'object'. Press **Search** once more.

You will now have 158 statements because, besides statements using 'asase_kokoo' or 'asase_tuntum' you have also selected the statements related to the superobjects of 'asase_kokoo' and 'asase_tuntum' i.e. 'soil'.

Closing a knowledge base and finishing off

Close the knowledge base by selecting **KB** → **Close KB...** and close AKT by going to the main menu **File** → **Exit from AKT**.