

CHAPTER THREE – PREPARATION FOR KNOWLEDGE BASE CREATION

The following chapters 3 – 5 detail the procedure for creating a knowledge base within AKT and should therefore be considered and applied in conjunction with one another. Knowledge base creation involves abstracting knowledge from the information collected, the formal representation of that knowledge and the specification of hierarchical relationships between terms in the knowledge base. As soon as the first statements have been entered into AKT, a knowledge base has been created. This knowledge can then be evaluated and thereby provides a basis for further knowledge elicitation and representation as well as modification of current representation. The process of knowledge base creation involves a tight cycle of knowledge elicitation, knowledge representation and knowledge base evaluation.

NOTE: The importance of evaluating the knowledge base after each new round of inputting unitary statements cannot be overemphasised.

3.1 PREPARATION

Creating a knowledge base involves specifying the objectives behind it, and defining its boundaries.

3.1.1 SPECIFICATION OF OBJECTIVES

The creation of a knowledge base involves identifying the knowledge to be included. These decisions are most effectively and consistently made if taken in relation to an explicit set of objectives. The quality (usefulness) of a knowledge base depends very much upon the objectives being both *specific* and *clear*.

When specifying the objectives it is necessary to strike a balance between the need for precise objectives to guide the knowledge acquisition process and the need to avoid compromising the knowledge acquisition process by adhering to any preconceived ideas which helped formulate the objectives in the first place. An appropriate balance may best be achieved by making the *purpose* of the knowledge base the objective, rather than the actual structure and content of the knowledge base the objective.

For example, research in Nepal was intended to:

Document explanatory ecological knowledge used in decision making by farmers in managing their farmland tree fodder resources in order to better inform national and regional research efforts.

Subsidiary objectives for the same research could be:

Comparison of the local knowledge with scientific knowledge.

These objectives for using the contents of the knowledge base(s) provided a framework for its creation.

The iterative nature of the process of knowledge base creation allows the reassessment and modification of objectives as the knowledge base develops.

3.1.2 BOUNDARIES OF THE KNOWLEDGE BASE

The second stage in the process of preparation is to define the boundaries and contents of the proposed knowledge base. The boundaries must be defined with reference to the stated objectives.

The knowledge base is an arbitrary unit. Two knowledge bases may be merged into a single knowledge base or a single knowledge base may be split into two. Furthermore, different sets of knowledge may frequently be needed for different tasks. The mechanism for developing different topics from a formal knowledge base (see Chapter 7) provides a means of dividing a knowledge base into subsets, effectively creating smaller sets of knowledge with which to reason.

It is better to create fewer knowledge bases covering a broader range of knowledge rather than many small knowledge bases. This reduces repetition of core knowledge amongst knowledge bases. However, ensuring consistent and unambiguous use of terms, coherence and completeness becomes an increasingly demanding task as the knowledge base grows in its breadth of coverage. Furthermore, too large a knowledge base is unwieldy, implementational constraints (such as computer memory and speed of processing) have an increasing impact as the knowledge base grows in size. It is necessary to define clear boundaries for a knowledge base and to represent unrelated knowledge in different knowledge bases in order to ensure the creation of tractable results.

For example, in the Nepalese case study three discrete topics were identified on the basis of the objectives given above, and in consideration of the domain that had to be investigated in order to generate a comprehensive record of the explanatory ecological knowledge used by farmers in managing their farmland tree fodder resources. These topics were:

- the propagation of tree fodder resources,
- tree-crop interactions and the selection and
- evaluation of different fodder for livestock.

As a result, three knowledge bases were created.

As with the specification of objectives, the specification of boundaries may be iterative. Initial acquisition of knowledge related to tree fodder demonstrated that while these three topics merited consideration, much basic understanding was common to all of them. The knowledge base boundaries were, therefore, modified by merging the three knowledge bases.

By identifying the boundaries of the knowledge base one automatically sets the specifications upon which the knowledge elicitation strategy can be based.

Key points of Chapter Three:

Preparation before actually developing a knowledge base involves two crucial activities:
Specifying objectives of creating a knowledge base
Defining scope and boundary of the knowledge base

The purpose of the knowledge base should define the objectives – not any preconceived specification of the structure and contents of the knowledge base
As a knowledge base develops, both the objectives and the boundaries can be redefined.