Negotiation-support toolkit for learning landscapes

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Joshi L, Sinclair F and Mulyoutami E. 2013. Local ecological knowledge: agroecological knowledge toolkit (AKT5). *In:* van Noordwijk M, Lusiana B, Leimona B, Dewi S, Wulandari D (eds). *Negotiation-support toolkit for learning landscapes*. Bogor, Indonesia. World Agroforestry Centre (ICRAF) Southeast Asia Regional Program. P.43-46.

5 Local ecological knowledge: agroecological knowledge toolkit (AKT5)

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The Agroecological Knowledge Toolkit (AKT5) provides a systematic framework for documenting and subsequently analyzing local agroecological knowledge. Within the frame of a relational database, local knowledge is teased apart into unitary statements that can subsequently be viewed with all their interconnections.

Introduction

Local ecological knowledge (LEK) refers to what people know about their natural environment, based primarily on their own experience and observation. LEK is widely seen as important and of potential use in research and development programs related to natural resource management. However, there is a need for effective methods for exploring, accessing and evaluating LEK if it is to be integrated into the planning process in an explicit manner. One method that has been developed to enable representation of local knowledge is a knowledge-based systems approach. In this method, qualitative LEK are articulated by local people and represented using computer software. This is based on earlier studies (reviewed in Walker and Sinclair 1998) that show the majority of articulated knowledge can be broken down into unitary statements of knowledge that can then be represented through computer software using a formal grammar and a local taxonomy of terms. Such represented knowledge can then be subjected to synthesis and evaluation in an objective and unbiased manner.

The AKT5 software was developed at the University of Wales, Bangor, UK, with contributions from many national and international research and development institutions (Walker and Sinclair 1998, Joshi et al 2004a, b). It was designed to create knowledge bases from a range of sources. It allows representation of knowledge elicited from farmers and scientists or knowledge abstracted from written material. The methodology involves the creation of knowledge bases that comprise formal records of local knowledge that then can be flexibly accessed and used by research and extension staff.

Research using the AKT5 system has shown that local people often have sophisticated knowledge about ecological processes underpinning natural resource management.

Objectives

1. Document local agroecological knowledge in a form that allows the representation of an interconnected knowledge system, built up from unitary statements.
2. Select statements that can be used to analyze how widespread are specific forms of knowledge.
3. Compare knowledge systems beyond locations and/or stakeholders.

Steps

1. Download most recent version of the AKT5 software

The latest version of the AKT5 software can be downloaded free for non-commercial purposes from the AKT website: http://akt.bangor.ac.uk.

2. Read the manual

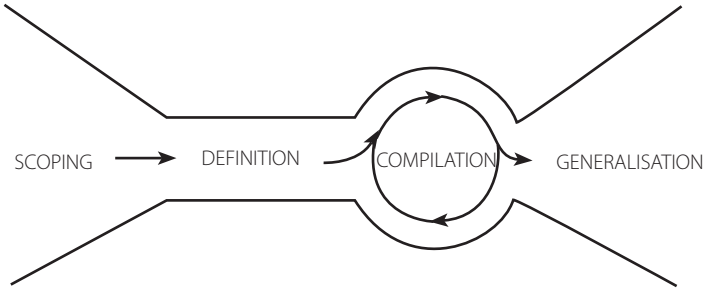
The process of acquiring and representing knowledge using this system is described in the AKT5 manual (Dixon et al 2001). Essentially, during knowledge-base creation, knowledge is elicited through a process of semi-structured interviews with a stratified sample of carefully selected informants. This knowledge is then broken down into short statements, comprising single items of knowledge that we refer to as unitary statements. These are then represented with a computer using a formal grammar. In practice, the process of representation requires evaluation of the knowledge as it is entered and provides the basis for further questioning. This iterative process of elicitation and representation continues until no new knowledge is revealed by further questioning. Robust knowledge bases on specified topics from well-defined sources are created. The knowledge is stored in a form that is comprehensive, accessible and easily updated. Automated reasoning tools assist comparative analysis of knowledge held by different groups of people and can be customised to explore the implications of combining local and scientific knowledge.

3. Knowledge elicitation

The framework is divided into four stages (Figure 5.1).

1. Scoping
2. Definition of the domain
3. Compilation
4. Generalisation

The important feature of this four-stage strategy for knowledge acquisition, in terms of sampling, is the separation of knowledge-base development (the first three stages), where a small purposive sample of people are intensively involved, and the generalisation stage, where a large randomised sample of people is drawn from the target community to explore how representative the knowledge base is.



Objective	To refine knowledge acquisition objectives	To generate a broad understanding of domain and define boundaries and terms	To create coherent and comprehensive knowledge base	To test how representive the knowledge base is of farmers generally
Informants and activities	A broad range of activities a cross the community	One or two intensive interactions with a small number of purposively selected informants	Iterative cycle: repeated interaction with statified sample of key informants, knowledge representation and evaluation of emerging knowledge base	A variety of questionnaire-based survey approaches on a sufficiently large and randomly selected sample of informants from the community

Figure 5.1. Four stages in elicitation of local ecological knowledge

Source: Dixon et al 2001

Sets of unitary statements as captured in the knowledge base should be evaluated in terms of

- repetition,
- contradiction,
- completeness and
- consistency in use of terms,

as elaborated in Dixon et al (2001).

4. Analytical steps

For use in negotiation support we are particularly interested in a comparison of the LEK, PEK and MEK mental maps of the world. If all three are similarly mapped in AKT5 we can now start to overlay them and explore consequences (Table 5.1).

Table 5.1. Analysis of differences and overlaps between knowledge systems, with consequences for negotiations

	Examples	Consequences for negotiation	Suggested next steps
Areas of agreement	Although details may differ, all knowledge systems recognize effects of trees on microclimate	Actions that directly align with this shared knowledge have good chance of being accepted by all	This common ground can form the basis of agreements, needs to be in the preamble
Areas of contradiction	While foresters (PEK) claim their tree planting increased water availability, farmers (LEK) perceived the opposite effect; MEK mostly agrees with LEK	Negotiations will move in circles around such hot issues until a common cognitive base is found	This contrast needs to be analyzed and where feasible to be resolved by joint fact-finding on agreed criteria and case definitions
Differences in detail of articulation	Science (MEK) will usually have more detail but also more recognized uncertainty than either LEK or PEK	Differences in detail (or in degree) of explanations are okay as long as they don't affect expected response to actions	Optimal fuzziness may require multiple iterations of further clarification and compromise
Topics absent from one or more	Local knowledge (LEK) may invoke spiritual links absent from (if not contradicted by) science (MEK); MEK relates to fundamental laws not understood locally; PEK tends to deny or ignore negative consequences of current economy	Discussions between 'believers' and 'non-believers' have little chance of progress as neither side will leave their trenches	Seek optimal fuzziness as before, while creating safe space outside negotiations to explore complementarity of 'wisdom' behind the 'knowledge'

Examples of application

The AKT methodology has been used successfully in a number of projects in Asia, Africa and Latin America and has been adopted globally by the World Agroforestry Centre. This has included use with the development of multistrata cocoa and non-timber forest products in Ghana and Cameroon; jungle rubber, soil erosion and conservation and Javanese home garden systems in Indonesia; participatory plant breeding for cassava in Colombia and hill maize in Nepal; forest gardens and smallholding rubber in Sri Lanka; range management in South Africa and Lesotho; and trees in crop fields and rangelands in Kenya and Tanzania. A Spanish language version is used in Latin America by the Tropical Agricultural Research and Higher Education Centre and a Thai version has been developed in conjunction with the Department of National Parks, Wildlife and Plant Conservation in Thailand. New applications include peri-urban vegetable production and waste recycling in Viet Nam and China, alternative animal health care in Wales and a group of users have created an email network to support a range of activities in the Philippines.

Key references

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The landscape scale is a meeting point for bottom–up local initiatives to secure and improve livelihoods from agriculture, agroforestry and forest management, and top–down concerns and incentives related to planetary boundaries to human resource use.

Sustainable development goals require a substantial change of direction from the past when economic growth was usually accompanied by environmental degradation, with the increase of atmospheric greenhouse gasses as a symptom, but also as an issue that needs to be managed as such.

In landscapes around the world, active learning takes place with experiments that involve changes in technology, farming systems, value chains, livelihoodS' strategies and institutions. An overarching hypothesis that is being tested is:

> Investment in institutionalising rewards for the environmental services that are provided by multifunctional landscapes with trees is a cost-effective and fair way to reduce vulnerability of rural livelihoods to climate change and to avoid larger costs of specific 'adaptation' while enhancing carbon stocks in the landscape.

Such changes can't come overnight. A complex process of negotiations among stakeholders is usually needed. The divergence of knowledge and claims to knowledge is a major hurdle in the negotiation process.

The collection of tools—methods, approaches and computer models—presented here was shaped by over a decade of involvement in supporting such negotiations in landscapes where a lot is at stake. The tools are meant to support further learning and effectively sharing experience towards smarter landscape management.

World Agroforestry Centre
ASB Partnership for the Tropical Forest Margins
AARD
Federal Ministry for Economic Cooperation and Development
Norad
IFAD Enabling poor rural people to overcome poverty
CGIAR Research Program on Forests, Trees, and Agroforestry