

SOCIO-ECONOMIC METHODOLOGIES
FOR NATURAL RESOURCES RESEARCH
BEST PRACTICE GUIDELINES

LOCAL PEOPLE'S KNOWLEDGE IN
NATURAL RESOURCES RESEARCH

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Production of this publication was funded under project R6800, by the Natural Resources Systems Programme of the United Kingdom's Department for International Development.

The Natural Resources Systems Programme is one of twelve research programmes funded by DFID's Natural Resources Research Department. Together they form DFID's Renewable Natural Resources Research Strategy (RNRRS), directed towards the priority problems in a wide range of developing countries. The Socio-Economic Methodologies component is charged with improving the design, delivery and impact of renewable natural resources research projects under the RNRRS. The priority is to make research more relevant to the needs of the intended beneficiaries, better targeted towards developmental rather than scientific objectives and leading to better uptake and impact of research outputs.

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Natural Resources Institute
ISBN 0 85954 496 – 6

INTRODUCTION

Innovation and knowledge about natural resources come from many different sources; application of new knowledge does not occur in a vacuum but has to be incorporated into specific social and ecological contexts. Farmers have been developing agricultural systems, domesticating animals, breeding new crop varieties and constructing irrigation systems throughout the centuries without the aid of formalized scientific approaches and agricultural extension systems. In order to develop sustainable strategies it is important to take account of, and learn from, what local people already know and do, and to build on this.

A variety of terms have been used in the development literature to refer to the collective knowledge of local people: indigenous knowledge, indigenous technical knowledge, 'traditional' knowledge and rural people's knowledge. The term 'local people's knowledge' (LPK) is used here to include local knowledge of people in both rural and peri-urban and urban communities who use natural resources in some way. This includes farmers – and those with other occupations, such as pastoralists, foresters, hunters and gatherers – fisherfolk, artisans, food processors and traders. Although many are likely to be poor, relatively powerless and marginalized, local knowledge is also held by those in Government and the private sector.

APPROACHES TO UNDERSTANDING LOCAL PEOPLE'S KNOWLEDGE

There have been a number of different approaches to looking at LPK. Before the 1970s, the study of local knowledge systems tended to be the preserve of anthropologists and ethnoscientists. Since then there has been a growing interest by development specialists in the role of local knowledge in development, which focused initially on indigenous technical knowledge (ITK). Over subsequent years the debate on LPK has widened from a concern with technical knowledge *per se* to an emphasis on the processes of knowledge generation and the interactions between those involved in development, adoption and diffusion of knowledge.

Transfer of technology

In the 1950s and 1960s a prevailing view was that scientific knowledge applied to problems of rural poverty in developing countries would provide the necessary impetus needed to transform rural people's lives and increase their welfare. New technologies were generated and transferred to extension services for dissemination to farmers. The flow of knowledge was one-way: from scientifically trained researchers via extension to farmers, with little direct feedback from local people into research and development. Criticism of this approach, known as the transfer of technology (TOT) model, was prompted by the growing evidence that many development projects were not working well and farmers were not adopting recommendations. Instead of the non-adopting farmer being regarded as inherently conservative or irrational, it was argued that the recommendations and technologies were not always appropriate to the farmers' circumstances. There was concern that rural people's knowledge of their environment and farming systems, and their social and economic situation had been ignored and underestimated. Although the debate

on LPK has moved on, in practice the TOT model continues to exercise a strong hold in many development projects and in research and extension systems.

Indigenous technical knowledge

Concerns over the TOT model led to an increased interest in looking at resource-poor farmers' knowledge of their environment and farming systems, particularly their indigenous technical knowledge (ITK). Numerous studies have pointed out the richness and depth of LPK and shown that farmers have detailed knowledge of their local environment and observe natural phenomena closely (Box1). Examples include the Hanunoo farmers in the Philippines who could identify 400 more varieties of rice than taxonomists and the Kenyan farmers who described aspects of the life cycle of variegated grasshoppers of which scientists were unaware. Local people not only observe their surroundings but also experiment and develop technologies to fit their own environment. Experiments may be undertaken as part of normal farming practices and can be divided into those aimed at solving particular problems and at adapting technologies to local circumstances, and those simply undertaken out of curiosity, to see what happens.

BOX 1: DIFFERENCES IN LOCAL KNOWLEDGE

Brokensha and Riley (1980) provide an example from the Mbeere people of central Kenya:

"Generally, the best information about the small annual herbs is obtained from older women; herd-boys, being always hungry and also experimental, are experts on the range of wild edible fruits; honey-collectors show the most detailed knowledge of flowering sequences, and indeed know most differential characteristics of their local plants. Yet even within a group, one individual will stand out because of keen powers of observation, prodigious memory, curiosity and intellect."

A WIDER PERSPECTIVE ON LOCAL KNOWLEDGE SYSTEMS

More recently there has been a move amongst development specialists towards a wider definition of local knowledge which includes cultural as well as technical knowledge. This move to rural people's knowledge from ITK recognizes that local technical knowledge is interlinked with social and political knowledge and skills.

Knowledge and access to knowledge are not spread evenly through a community or between communities: people have differing objectives, interests, perceptions, beliefs and access to information and resources. Knowledge is generated and transmitted through their interactions within specific social and agro-ecological contexts. Knowledge and power are interlinked. Differences in social status can affect perceptions, access to knowledge and, crucially, the importance and credibility attached to what someone knows. It is the knowledge of the most marginalized people that is likely to be disregarded.

Issues of power and social relations are, therefore, not irrelevant to local knowledge but are fundamental to it. Approaches such as participatory action research are used as a means whereby researchers can act as facilitators in encouraging local learning and action. Instead of just gathering knowledge from local people and incorporating

it into development projects, practitioners increasingly emphasize the active participation and negotiation by local people in knowledge generation and use.

Knowledge systems are dynamic. People adapt to changes in their environment and absorb and assimilate ideas from a variety of different sources. Rural societies are not completely isolated from 'western' or any other types of knowledge systems and within each society there are multiple sources of innovation. In a few very isolated societies, where there has been little change within the farming system, it may be possible to identify knowledge systems which can be considered 'traditional', i.e. a discrete stock of knowledge generated at some (unspecified) time in the past. However, in most rural areas, the use of the term 'traditional' knowledge to distinguish LPK from 'modern' knowledge is misleading as it tends to imply a static, unchanging system.

Knowledge systems are not objective, detached and value-free but are inextricably linked with the social, political and agro-ecological context in which they arise. This applies as much to 'western' science as to any other system of local knowledge.

WHO HAS KNOWLEDGE AND WHOSE KNOWLEDGE COUNTS?

One consequence of this view of LPK is that it is important to find out who has knowledge – and who has knowledge of what domains – and whose knowledge counts within the community. The depth of knowledge about natural resources amongst local people may vary depending on their familiarity with the resources, the differences in responsibilities and differences in individual interest and intellect.

Power structures may mean that those who have a more in-depth knowledge may be ignored by researchers or other development practitioners in favour of those with higher status. For example, landless labourers in South East Asia may know more about non-rice food sources in the paddy than the farmers who own the land; the knowledge of a Fulani herdsman in West Africa about cattle may be ignored because he is an outsider and not fully integrated into the local community, despite the cattle owner delegating responsibility for looking after the cattle to him. When asking for a farmer who is knowledgeable about cropping systems, the researcher may well be taken to the largest and richest farmer (who has sufficient money to solve any technical issues) rather than to poorer, more knowledgeable individuals who have to rely on their own ingenuity to solve problems.

The effects of power relations can often be seen in differences between men's and women's knowledge, which may differ because of gender-based differences in division of labour. For example, women may be responsible for certain crops or certain processes or operations such as post-harvest processing. Similarly, their access to knowledge may be affected. Women may have less access to some modes of knowledge transmission such as formal education or village meetings with agricultural extension officers. However, it should be borne in mind that there may well be many groupings within each gender and that such differences could also be applied to other social groups (differentiated by age, status, wealth, etc.).

DIFFERENCES IN UNDERSTANDING AND DESCRIBING NATURAL PHENOMENA

When studying LPK, researchers need to be aware that local people may use concepts which are different from theirs in understanding natural phenomena, in their classification systems and in the language they use to express these. They may also have different methods of experimenting and validating new information.

Concepts

Researchers commonly use a number of concepts to aid further understanding of natural resources and agricultural systems, such as soil fertility, disease, natural enemies and plant resistance. It should not be assumed that these will always relate directly to equivalent concepts of local people, who may have their own ideas and terms to understand and describe the world around them. Research and extension messages based on scientific explanations are likely to be reinterpreted by local people in the light of their own concepts. Local ideas of cause and effect may also vary from place to place, for example, in some communities, incorporating moral or supernatural causal agents in addition to natural phenomena.

Classification

Local classification systems may vary both in the characteristics used and in the detail and depth of classification. In some cases the classification relates closely to the practical use, for example, soil types may be classified according to their use, i.e. 'good for yam' or 'good for cassava', rather than the soil structure and nutrient content. Farmers tend to have more detailed and in-depth classifications and knowledge about 'important' and visible phenomena, but limited knowledge of things which they consider to be unimportant or difficult to observe. Local classification systems vary in the extent to which they are widely used or are specific to a particular district, village or sub-group and in the degree to which classifications and explanations are consistent or divergent.

CHARACTERISTICS OF FOUR CLASSES OF FARMER KNOWLEDGE

Ease of Observation		Importance
Many categories Shallow taxonomy Organisms labelled at biological order or family level Little explanation	Many categories Many-layered taxonomy Organisms labelled at biological species level 'Positivist' explanations	
No categories No explanations No organisms labelled	Sometimes many categories Sometimes shallow taxonomy Some organisms labelled at biological species level Explanations from folklore	

Source: Bentley (1992)

Language

The language used by farmers and other rural and urban/peri-urban workers to describe local concepts and classifications often has no direct translation into English or other languages. The complex task of interpreting categories expressed in local languages is well illustrated by examples from a project investigating local knowledge of soils in Tanzania and Uganda (see Box 2). Local names may be highly specific to location, for example, the word *osa* is used in certain villages in Ghana to mean specific types of caterpillar; in other villages where the same local language (*Twi*) is spoken, *osa* has a more general meaning including stem-borers and other larvae.

BOX 2: CASE STUDY: LOCAL KNOWLEDGE OF SOILS IN TANZANIA AND UGANDA

When farmers were asked about their different 'soil types', a long list of categories was produced. However, on closer discussion it became clear that this contained local terms describing land in multiple senses, including terms referring to land use, e.g. cultivable and non-cultivable land, plots growing food or cash crops, grazing areas, open spaces, etc., as well as physical descriptions of the soils. Categories overlap and coexist rather than being exclusive and their boundaries are fuzzy rather than fixed and definite, e.g. three different terms were given for 'sandy' soils in a village in Katakwi District, Uganda. These were loosely distinguished by different sand grain size and colour, fertility and subsoil but all were more or less sandy.

Experimentation

Methods of experimentation may differ – local people use observation, experience and trial and error but their methods may not be systematic, nor analytical, compared with scientific methods. However, this is not always the case, as farmers have carried out research using sound empirical methodology in evaluating rice germplasm. On the other hand, there are also cases where scientific knowledge is not applied in an objective way and where many advances are made on the basis of trial and error. An issue in participatory on-farm experimentation arises where scientists use specified control plots and replicates, in contrast to farmers' continuous adaptation of 'treatments' and comparison over seasons.

COMPARISONS BETWEEN KNOWLEDGE SYSTEMS

Although differences in understanding natural phenomena can be identified between LPK and scientific knowledge, drawing a clear line between the two systems is difficult. There is great diversity within knowledge systems, whether these are labelled as 'indigenous' or 'western', 'local' or 'scientific'. The knowledge systems of Bolivian smallholders may vary considerably from those of Somali pastoralists, and many types of knowledge will coexist within each community. Comparisons between LPK and science are, therefore, comparisons between different knowledge systems, rather than an evaluation of LPK against the absolute, objective standard of science. Simply labelling any LPK that does not conform with scientific research as 'wrong', without trying to understand why the differences exist between local peoples and scientists perceptions, is unlikely to be helpful in developing useful research that can build on what people already know.

STRENGTHS AND LIMITATIONS

The strengths of LPK lie in local people's ability to observe events over a sustained period of time and focus on what directly affects their lives. They can develop and place technologies in both their social and ecological contexts. Many societies, having low external inputs, innovate in an attempt to adapt and control their environment. This can give them an intimate knowledge and understanding of their immediate environment.

However, it is important not to over-romanticize LPK. Farmers know a lot but not everything – they may know much about agricultural cropping systems but their agricultural knowledge is not all-embracing or omniscient. Whilst scientists may learn from farmers about the important and noticeable phenomena, farmers, who lack the means to observe microscopic elements, can equally learn from scientists about the less easily observed phenomena.

Knowledge of indigenous peoples is important in managing and conserving natural resources; this has yielded a view that such knowledge leads to sustainable practices and reflects a balance between people's needs and nature evolved over time. However, whilst such links between environmental conservation, local knowledge and practices of indigenous societies may certainly exist and be of great value, a completely uncritical acceptance of LPK as always synonymous with conservation can be misleading.

IMPORTANCE FOR DEVELOPMENT

Having discussed approaches to, and characteristics of LPK, we can identify the following areas in which LPK is important for development.

- **An essential first step for any development project** As a basic requirement, any project which seeks to introduce new knowledge and new technologies should find out first what people know. Not to do so is arrogant and discourteous, and risks the possibility of introducing elements which are known already, or which are not appropriate.
- **Assists the process of adaptation of technologies to local conditions** Local people's understanding of their own agro-ecological and social environment means that their knowledge can contribute to developing appropriate solutions.
- **Adds to scientific knowledge** LPK may be more extensive or in-depth than that of researchers, especially about how to survive in harsh and marginal environments – which may also be of use elsewhere. In addition valuable local knowledge can be recorded and preserved.
- **Increases understanding between researchers and local people** An increased understanding of the farmers' knowledge systems allows a better understanding of the rationale behind their actions. It can also facilitate information exchange and local people's access to sources of information.

- **Increases capacity to experiment and innovate** In a changing environment, the capacity to find solutions for new problems is vital. Incorporating LPK into development projects is a means of supporting this by encouraging community self-diagnosis and raising awareness.
- **Helps to empower local people** More local participation in research and increased respect for local knowledge may help focus attention more clearly on the needs and priorities of the poor and may also add to their self-esteem.

CONTRIBUTION TO NATURAL RESOURCE RESEARCH

Ways of finding out about and incorporating LPK in natural resources research and development (R&D) will depend on the objectives, scope and resources available in the project. Whatever approach is taken, the questions that should be considered include:

- Who knows or needs to know?
- What do they know? (and what do they not know?)
- How is knowledge generated, held, changed and transmitted?
- How does knowledge relate to action?
- How can LPK and learning processes be explored and enhanced within projects?

Who knows or needs to know?

These questions relate both to who is knowledgeable on the subject matter of the research and, more fundamentally, to who is controlling the focus and direction of the research process or development activities. It may appear obvious who should be involved in studies of LPK, but it should not be assumed that the local people, most visibly and directly associated with the natural resources concerned, are the only people worth talking to. Some types of knowledge are fairly evenly distributed within a community, others are shared by a specific group or held by an individual 'expert'.

A useful first step is to identify all the different groups or individuals who use or have some dealings with the subject in question (see also Grimble, 1998). Stakeholder discussions can be held with farmers, traders and village leaders, then, in following up the first recommendations, additional, less obvious stakeholders will be identified. In each case, individuals may have differing but pertinent knowledge. For example, those with an interest in non-timber forest products would include farmers, hunters, herbalists, fuelwood collectors, wood carvers, gatherers (of fruit, snails, etc.) loggers and wildlife officers. Gatherers may know a lot about where different fruit or other species of plant grow, but little about economic timber trees. Similarly, for weed control, farmers, women labourers (weeding), male labourers (pesticide application), pesticide dealers, and extension staff would have different interests and perspectives. If women are responsible for weeding, they may know more about types of weeds than the (male) farmer. Labourers who are in the field every day may observe more about pests and diseases of the crop than a farmer who visits once a week.

Sharing knowledge takes place as part of the social exchanges in local communities and between local people and outsiders. How this latter relationship is initiated and managed is crucial in encouraging exchange of knowledge and fostering understanding. There can often be some reluctance on the part of both the researcher and the local people. If researchers, pursuing a focused research topic, avoid the time-consuming process of consulting the wider community in favour of articulate individual local experts, they may miss out on understanding how knowledge and practice are actually distributed among local people. Where local people are not fully involved in the discussion and explanation of the research, they may fear researchers' agenda or, conversely, participate in information sharing in the expectation of material assistance from the project. There may be pressure (from local leaders and researchers) to ignore certain individuals because they are not educated. Local farmers may prefer to answer for their labourers or family; men often try to answer for women. Farmers themselves may feel embarrassed and reluctant to talk to the researcher.

What do they know?

Researchers should be clear about their objectives, and there is a large difference between (a) finding out whether local people comprehend scientific knowledge and recommendations and (b) finding out local people's own understanding of the world around them.

Many studies of farmers' knowledge concentrate on the first objective and effectively set out to assess farmers' knowledge of scientific terms and practices. Although such studies may be useful, they are limited in that they investigate only what the farmer knows in terms of formal science and not in terms of his or her own concepts. Finding out about local people's own knowledge requires the researcher to be open to different ways of viewing the world, and not to assume that local people automatically use the same set of concepts as they do. It is also of key importance to recognize that such openness should be part of an ongoing process of dialogue and interaction.

The main areas where there may be differences between local people's and researchers' knowledge include:

- classification and identification of natural phenomena
- concepts of cause and effect
- concepts of natural resource processes.

How is knowledge generated, held, changed and transmitted?

There are a number of questions that are useful to consider:

- What are people's sources of knowledge?
- Who has access to what information?
- Who learns from whom?
- What influences/changes existing knowledge?
- How is new knowledge validated?

People obtain information from their own farming and natural resources management practices, from observations, experimentation and from many other

sources. Mapping out all sources of information and the linkages (theoretical and actual) between such sources and local people can illustrate where the main channels of information are and who has access to them. There is sometimes a tendency for researchers to overlook or ignore sources of information outside the formal research–extension linkages. Informal sources, such as advice from other farmers, also need to be considered since farmers may well hold their peers in higher regard. Commercial sources – agrochemical dealers and traders – can also be very important and influential together with information via the media. Ideas on nutrition, health, environment may be incorporated into ideas about agriculture and natural resources.

Validation and acceptance of new knowledge is important, especially in assessing how new ideas are taken up. Researchers may validate new information by replicated trials and other means. Farmers may not use such formal methods, but may still do their own experiments. Widespread acceptance may also depend on the endorsement of certain key people, for example, chiefs and large-scale farmers.

Participatory research is one way of incorporating knowledge generation directly into a project. Rather than the local people being the subjects of research, they are actively involved in the process (see Sutherland, 1998).

How does knowledge relate to action?

The relationship between knowledge and practice is not straightforward. The researcher cannot assume that knowledge *per se* will lead to a change in practice. For changes to occur, people need not only the relevant knowledge, but also the social and economic ability and incentive to change, plus an attitude to want to change. Conversely, the researcher cannot assume that a practice is not adopted because local people have insufficient knowledge. For example, farmers in Ghana were aware of the benefits of soil from rubbish dumps for plant growth but did not use such compost on their farms, despite its free availability. Farmers did not perceive its use as worthwhile because of the costs of transporting the compost to the farm, and its slow action. Many also disliked the idea of using dump soil containing untreated waste.

Farmers' knowledge is an implicit part of their everyday action, and is not necessarily expressed verbally. Often discussions between farmers and researchers generate accounts of what farmers usually do or think, but it is more difficult to unravel how this presentation of knowledge relates to action. Farming practice depends on the unfolding of events – more akin to a flexible performance than a fixed system. This is best explored by careful comparison of the descriptions of practice and its rationale, with particular cases of farming activity.

How can LPK and learning processes be explored and enhanced within projects?

Advantages of incorporating local knowledge into research and development have been outlined above. Practical applications include:

- changing research priorities **including** areas highlighted by local knowledge
- allowing better adaptation of research to the local environment
- identifying what farmers know and do not know – hence developing appropriate information and extension to fill gaps in knowledge
- enhancing local people's capacity to innovate and draw on their own resources.

The challenge is to find ways to create the synergy between researchers' knowledge and LPK, to the benefit of local people. Many methods have been used to elicit LPK and choices will depend on the objectives, scope and resources of the project, who is going to use the information and how much is known already. Research programmes, in particular, need appropriate and cost-effective methods for eliciting and documenting LPK. For the researcher without specialist, anthropological training, rural appraisal approaches can yield considerable insights if used with care. But it should be borne in mind that short studies, even if well-conducted, are unlikely to produce the same level of understanding as that obtained through sustained, specialist study.

Given the complexity of both local and scientific knowledge, it is not particularly useful to conduct a short survey of LPK at the outset of the project and then base all future research and recommendations upon it. Continual dialogue between farmers and researchers may reveal 'layers' of information with implications for the type of research being done, and the final recommendations.

METHODS FOR EXPLORING LPK

Many of the appropriate methods for investigating LPK are common to participatory research more generally and to stakeholder analysis (see Grimble, 1998; Sutherland, 1998); these areas are therefore only briefly referred to below. Before starting any field work, it is also worth checking secondary data sources, including those outside the immediate scope of the project. For example, in-depth studies carried out in fields, such as perceptions of human health, can yield useful insights into how people view their world, and how they consider cause and effect.

Participatory approaches

In participatory approaches local people are involved in working with researchers to assess their own situation, diagnose and prioritize problems and develop solutions. Qualitative research methods are used to enable local people to describe and discuss their situation (see Box 3). Because this involves an emphasis on local people's own knowledge and practices and is taking place within the community, use of such an approach can yield many insights into LPK.

It is important to note that qualitative, 'informal' methods nonetheless require as much or more skill from the researchers as for structured surveys. Poorly conducted participatory rural appraisals can produce superficial results or may be used to confirm what the researcher already thinks, without investigating in more depth. They also may be subject to interviewer bias, respondent bias and problems in translation in similar ways to structured surveys.

There is no finite list of techniques – the choice is dependent on the preferences and imagination of researchers and local people. Further ideas can be gained from literature such as the PLA notes (IIED). Experience suggests it is more useful to combine methods, not to rely on just one.

BOX 3: INFORMAL RESEARCH TOOLS FOR INVESTIGATING LPK

Semi-structured interviews Semi-structured interviews allow the participants more scope to investigate what people know and to follow up topics of interest as they arise in the discussion. They can be used with groups and individuals.

Group (focus) interviews Group interviews provide exchanges between participants with differences of opinion which can often lead to greater insights into people's perceptions. Care is required over the composition of the group so that as many participants as possible feel free to express their opinions, especially those with less status who may be better interviewed in a separate group or individually.

Key informant interviews 'Experts' – those identified by local people as having specialist knowledge – may be interviewed taking care that they do not only include those with formal education and access to scientific knowledge.

Field visits and transects These combine observation and discussion and are useful in allowing the farmer or respondent to point things out *in situ*. They may also provide a more relaxed atmosphere than a group meeting, making communication easier.

Field observations These are useful for comparison of actual practice to the 'norms' presented in group discussions or interviews.

Mapping, diagramming, ranking exercises and games These can be used to elicit farmers' perceptions, including spatial conceptions, definitions, classifications and boundaries. Tools include participatory mapping, ranking of importance, comparing characteristics using pairwise ranking diagrams, seasonal calendars and network diagramming.

Local classification systems/taxonomies This is quite a difficult area, involving the identification of local terms, then asking local people to sort and group the categories, identifying common features and contrasts in the context of the wider language and cultural system.

Cultural expression The content of songs, poetry and speeches on celebrations and public occasions can reflect significant messages and social values.

Structured questionnaires and knowledge tests

Structured questionnaires and knowledge tests have, conventionally, been used by agricultural extension researchers and others to find out about how much local people know. However, such a quantitative approach is not usually a good starting point for studies of LPK, unless the researcher already has an in-depth knowledge of local perceptions and practices. Imposing the rigid structure of a questionnaire implies that the researcher already knows enough about people's perceptions and practices to be able to write specific, unambiguous and comprehensible questions. In practice, these questionnaires may reveal whether the respondents understand scientific terms but provide little information on what the respondents' own ideas might be. Often the results are scored like a knowledge test. If a respondent's answer differs from scientific knowledge or recommended practice it may be classed as 'wrong' and he or she may be considered as having no knowledge.

However, structured surveys can have a useful role in following up and verifying hypotheses generated using rural appraisal and other qualitative methods. For example, if it has been found from group interviews that farmers think that certain weeds are good indicators of soil fertility, then a carefully worded questionnaire can be used to determine how widespread this knowledge is.

Surveys which relate the respondents' knowledge and attitude to their resulting practices are often known as knowledge, attitude and practice (KAP) surveys.

Some practical considerations

- **Change of attitude** The most important aspect in exploring LPK is not the variety or sophistication of the technique used but the attitude of the researcher in listening and observing, and not imposing their own ideas on those of the local people. This can prove difficult for researchers, who are used to giving recommendations and are trained to regard a scientific approach as the only way forward. Keeping an open mind, and recording differences between local people's perceptions and researchers' perceptions, together with the reasons for this, are more useful than simply recording LPK as 'wrong' or conversely, as always 'right' and 'in tune with nature'.
- **Joint discussions and understanding** The two-way transmission of knowledge between local people and researchers is complex – each interprets information in terms of their expectations and social and cultural understandings. There are different interpretations of reality, especially where conflict exists. 'Negotiating' – in the sense of exploring these different perspectives, views and significances – is a process of joint discussion and observation which, from the researchers' side, is best undertaken by an interdisciplinary team including members with social anthropological skills.
- **Power relations** Rural people, especially the poor and marginalized, may be hesitant to explain to richer and more educated researchers what they do and why, preferring to defer to the more powerful and accept recommendations passively without comment. They may regard their own knowledge as being so obvious that it does not need to be explained or would be regarded as irrelevant, or they may regard themselves as being ignorant. There are a number of ethical and political issues associated with the pursuit of local knowledge. The possible outcome of the exchange of knowledge should be borne in mind. For example, local knowledge of medicinal plants potentially has a commercial value and issues of ownership, recompense and intellectual property rights should be a major concern.
- **Problems in concepts and language** Differences in concepts and the language to explain them may hamper communication, particularly where farmers and researchers do not share a common language. Local terms describing natural phenomena may have no direct translation into English and researchers' questions may not easily translate into local languages. Even researchers who speak the local language may find it difficult to translate local terms as they may have never used them in their 'scientific' work. Researchers need to be aware that the full meaning of concepts can easily be lost or distorted when translated. Encouraging the use of local language terms is useful and pilot training sessions for translators can establish a joint understanding of field procedures before encountering the actual situation.
- **Context** Observation within the appropriate situation can be important. For example, farmers shown pictures or samples of insect pests in bottles may have great difficulty in recognizing what they are. This may not be because the farmers do not know the insect, but because they are being shown out of their natural

context. Farmers are not used to looking under microscopes at tiny differences in shape or patterning – they normally distinguish between insects by their location, choice of host, position on the plant, type of flight, etc. A single dead leafhopper in a bottle is very different from several of them fluttering around the leaves of rice plants.

CONCLUSION

Knowledge is much more than a collection of facts: it relates to the whole system of concepts, beliefs and perceptions that people hold about the world around them. This includes the way people observe and measure what is around them, how they set about solving problems, and how they validate new information. It also includes the process whereby knowledge is generated, stored, applied and transmitted to others.

Local people's knowledge plays a vital role in natural resource research and development. However, such knowledge is not something that can be instantly picked up and used by outside researchers, independent of the situation in which it was generated. Understanding local people's knowledge requires that researchers are aware of possible differences and complexities in how people view the world around them, and in how they interact with each other.

The potential benefits in utilizing and enhancing local knowledge and learning processes within projects are significant. A better understanding of what local people already know and the characteristics of local knowledge systems can help researchers and local people to work together more effectively in implementing projects which have developmental impact.

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