
Participatory assessment, monitoring and evaluation of biodiversity: the art and the science

A background paper for the ETFRN Workshop on Participatory Monitoring and Evaluation of Biodiversity

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Summary

1. The purpose of the paper is to catalyse discussion in the EFRN Workshop on Participatory Monitoring and Evaluation of Biodiversity, 7-25 January 2002.
2. Increased demand for biodiversity assessments comes from the Convention on Biological Diversity (CBD), changes in impact assessment practice, and community resource management. All of these changes are supported by the CBD but also by parallel trends supporting decentralisation of resource management. Scientific assessment is a huge task alone; biodiversity assessment by and with non-scientists is also increasing for a range of reasons:
 - They may provide short-cuts to scientific assessments
 - The data from participatory assessments may be uniquely useful to local resource managers in a way which scientific assessment is not
 - Such assessments may provide ways of linking in to scientific information which is relevant to local needs
 - They may provide a means to enhance inclusivity of decision-making.
3. The actors in participatory biodiversity assessment include: local communities; development practitioners and project managers working with rural communities; local and national planners, particularly those preparing Biodiversity Action Plans; national and international advisers and policy-makers, including international NGOs, donors and members of the CBD secretariat; researchers; the conservation lobby and representatives from the private sector. They have different reasons for, and approaches to, participatory biodiversity assessment, and varying information needs. It is therefore helpful to analyse who is doing what, how, and why.
4. Assessment is affected by considerations of what is 'important', i.e. by value judgements. While conventional approaches have focused on species numbers, or species indicators, attention is moving to ecosystem approaches to assessment. These approaches emphasise the ecological processes and functions of biodiversity and are advocated in scientific assessment and through the Millennium Ecosystem Assessment. They may also be of particular relevance to rural communities – although to date local assessments often focus on selected useful species rather than on biodiversity as a whole.
6. The research focus on local assessments also focuses on useful species, and ethnobotany has made a major contribution to knowledge. However it is unclear to what extent such assessments are participatory in the sense that the 'researched' use the results. Research has been developing methods of understanding values other than utilitarian and species specific. There appears to be a gap between the types of method considered suitable for researching biodiversity values in developed and in developing countries; and in any case there are few examples of such research being initiated among the 'researched' (e.g. 'the public', local forest communities, etc.). There is a scarcity of methods and tools documented in the literature. Those that are mentioned tend to build on PRA (participatory rural appraisal) methods, especially mapping, ranking and transect walks. Methodologies associated with participatory monitoring and evaluation have become widespread in the last few years but biodiversity is not a conspicuous focus of such approaches and there is potential to look at how they can be adapted to the special requirements of biodiversity assessment. In particular, methods linking local and scientific assessments or values are scarce, and will probably benefit from building on ethnobotanical methods.
7. Different stakeholders are convinced by different kinds of information. Most decision makers expect, and scientists supply, information in quantitative species-based form. Participatory processes may not supply this so readily (or efforts to quantify may distort local perceptions) but may provide qualitative information of different and complementary value. There is a need to distinguish more clearly between the kinds of information needed by different people according to their objectives, and to clarify how different types of information can be communicated.
8. The potential for real synergy between different actors and their assessments of biodiversity depends not only on such communication, but also on realistic understanding of the costs and benefits of involving different actors in such assessments. An important

focus of the workshop will be discussion of the effect of participation on the participants, and potential for enhancing areas of mutual learning not only between participants but also across different geographical areas.

9. The workshop also needs to focus on the enabling policy and institutional factors, in order to communicate to decision makers ways in which policy and institutional structure can enhance the participation of different actors, information flows between them, proper recognition of the value of such information and equitable results from such participation. This will enable us to consider priorities for capacity-building.
10. In this background paper we have attempted to cover a representative range of experience available through the internet and published papers, but we are limited by space and time. We perceive in particular the following areas which would benefit from discussion in the workshop:
 - ethnozoology (our access is largely to the ethnobotanical literature);
 - bioprospecting and the ethical aspects of commercial biodiversity exploration through indigenous knowledge;
 - contribution from the private sector to define their information needs;
 - further clarification from local government in a range of countries, of their needs in preparing local biodiversity action plans.

Introduction

The ETFRN workshop on Participatory Monitoring and Evaluation of Biodiversity aims to explore ways in which different stakeholders (resource users, policy-makers and planners) can contribute to more effective and useful biodiversity assessments; in particular by involving non-scientific actors in biodiversity assessment, monitoring and evaluation.

This paper provides an overview of some of the work which has already been done in this area, identifies gaps, and asks key questions to catalyse the discussion during the internet conference in January 2002.

As we write this paper, already 180 participants have registered from a wide range of interest groups, including:

- development practitioners and project managers working with rural communities;
- local and national planners, particularly those preparing Biodiversity Action Plans;
- national and international advisers and policy-makers, including international NGOs, donors and members of the CBD secretariat;
- researchers;
- the conservation lobby;
- representatives from the private sector, who are undertaking biodiversity assessments as a requirement of EIA responsibilities.

All of them are interested in participatory biodiversity assessments. Why has this approach become so interesting?

Conventional approaches to biodiversity assessment are used for a number of different objectives. They might be undertaken nationally for compliance with the Convention on Biological Diversity (CBD), as part of an Impact Assessment, perhaps as part of developing a national system of protected areas, or as part of research looking at global patterns of diversity.

People whose livelihoods depend on such resources assess them in a different way in order to use or manage them. Still other stakeholders (often referred to as 'the public' or 'civil society') feel the effects of decisions made on the basis of all these assessments and have opinions about them. Local people's biodiversity priorities and assessments have rarely been incorporated into policy decisions affecting the relevant resources, and this can have serious implications for the relationship between biodiversity and local people, especially if management and land use decisions are based on conventional assessments only.

Also, in many tropical countries rich in biodiversity, there is still a great need for fundamental knowledge of what constitutes 'biodiversity', what genes, species and associations of these are actually present.

So there are at least three ways in which people want to use participatory biodiversity assessments:

- some want to ensure their own values and knowledge are taken into account;
- some want to ensure the values and knowledge of others are taken into account, in order to enhance inclusivity of decision-making;
- some want to ensure the values and knowledge of others are taken into account, in order to provide a short cut to their own information requirements.

However none of this is straightforward. Biodiversity assessment and monitoring are value-laden processes, even among scientists, but far more so when non-scientists are involved as well. Assessments take place at different scales; for example, biodiversity performance indicators at international and national level often relate to the percentage of area protected or of threatened species conserved. Clearly there is a disjunction here between local people's and international interests.

And furthermore, the developing methodologies of participatory monitoring and evaluation (PM&E) build on powerful traditions of action research and participatory appraisal, providing

new and useful knowledge through self-led inquiry, and enhanced understanding between stakeholders through shared learning. Such processes show that the values held by different groups in connection with biodiversity can change as a result of active involvement in such assessment processes.

Approach of this paper and the workshop

This background paper surveys the information available to us before the workshop, to help identify key areas which need the attention of participants in the workshop. We have relied largely on review material accessible to workshop participants through the internet, and papers forwarded to us by registered participants¹. This paper is intended to be short, so to avoid repeating information which is available on the internet we have indicated links to further sources of information in the boxes at the end. The paper is not a full academic literature review; in places we have expressed 'hunches' rather than fully supported conclusions, with the intention of stimulating debate.

Other workshops and conferences have already explored the need for useful and cost-effective monitoring systems (Web sources box 2, at the end of this paper). We do not wish to revisit this territory, but instead look more closely at the issues around different stakeholders' perceptions, values and information needs and how these may influence biodiversity assessment.

Our approach has been to search for biodiversity assessments that involve people other than scientists, and to look at four elements:

- **Who** is doing the assessment? Are they collecting the information for themselves, or are there 'intermediary' actors who are collecting information for use by others?
- **What** information are they collecting and analysing?
- **How** are they collecting and analysing the information?
- **Why?** What are their objectives in doing so, and how is this information being used?

Ultimately, through the workshop itself, we hope to understand the impact of such assessments, in terms of achieving more useful or valid biodiversity assessment. Obviously this is context-specific, and we need to identify the circumstances under which it is particularly important to incorporate different perspectives, and which methods work best under which circumstances both for conducting assessments and for analysing / integrating the results.

Dealing with such complexity is not easy under normal institutional arrangements, and we aim also to explore the policy and institutional environments which enable the development of more effective assessment and monitoring strategies. These may include formulation of guidelines aimed at supporting practitioners and decision-makers charged with the design of mechanisms to implement CBD obligations on biodiversity assessment; and capacity building.

In this review we have addressed the topic through progressive layers of complexity. First we look at how biodiversity assessments have been carried out; then explore how the underlying values have been researched, and the extent to which methods for these have been documented. We attempt to relate these findings to the information needs of different interest groups and explore the potential for more valuable assessments through more participatory approaches.

The amount of information in each section decreases as we progress through the review. This may reflect the fact that the subject is evolving, and we are only now beginning to address the social and institutional issues; or simply that people involved in developing the institutional and political aspects spend less time writing about it. In any case, we hope that the workshop will focus a wide range of minds on these issues and find ways forward.

Although we acknowledge the keen debate concerning definitions of '*biodiversity*', our stance is that perceptions of biodiversity will depend on who you are, your professional training and

¹ We have aimed to broaden from our own experience in tropical forest biodiversity, but we would welcome further material from other natural resource sectors, and from beyond tropical zones.

roles, what you value as an individual or as part of an institution, and what is 'expected' from the environment. We do not propose to debate definitions, either in this overview paper or within the workshop itself. If you are interested you might like to look at the two websites in Web sources box 1.

We list four terms relating to biodiversity information-collection for ease of discussion during the E-conference:

- *Assessment*: often used to mean a one-off detailed survey of biodiversity. We also use it here as a generic term to cover any of the following;
- *Inventory*: quantitative assessment of particular species;
- *Monitoring*: assessment to measure change; often based on indicators;
- *Evaluation*: method of prioritisation that recognises that different components of biodiversity have different values within a given context.

1 The objectives of biodiversity assessment post-CBD

1.1 Summary and key questions

While only 2-10% of all the species on Earth are known to science, scientists recognise that full surveys of biodiversity are not feasible with the meagre resources usually made available for biodiversity planning. They also recognise that even among scientists there is a lack of agreement about which assessment methodologies should be applied, and the various indicators that might act as proxies for biodiversity. This reflects not only the variety of biological contexts, and how to represent them within one assessment, but also differences in viewpoint about what is important.

Much conventional biodiversity assessment has been species based but increasing attention is being paid to the functional aspects of biodiversity, enshrined in the 'Ecosystem Approach' advocated by the CBD. There are also a plethora of methods for measuring genetic diversity, however, many of these remain costly and time consuming and, as a result, are applied only in very specific contexts.

There are differences among scientists, and between them and decision makers in terms of the components of biodiversity that they want to focus attention on. We see some participatory biodiversity assessment, all related to local management. We do not see any work linking local people's assessments to global needs.

Links to useful websites are given in Web sources box 2.

1.2 From global to local

The CBD provides a framework in which local and indigenous perspectives on biodiversity should be accommodated (summarised in table 1 at the end of the text). To date however more progress has been made with scientific biodiversity assessments, because they were able to build on centuries of biological exploration methods. After the Earth Summit (Rio 1992) the *Global Biodiversity Assessment* was initiated, and published in November 1995. This was an enormous job involving 13 teams of scientists, led by Vernon Heywood, and is described as 'an independent, critical peer-reviewed, scientific analysis of all the current issues, theories and views regarding biodiversity, viewed from a global perspective.' Complementing the scientific focus of this book, another entitled *Cultural and spiritual values of biodiversity* (edited by Darrell Posey) was published in 2000, representing an important step in recognising ethnically differentiated perspectives in biodiversity.

Countries which have ratified the Convention on Biological Diversity (CBD) are committed to the identification and monitoring of biodiversity (article 7), to respect and conserve relevant indigenous knowledge (article 8 (j)) and to the sustainable use of components of biological diversity (article 10). They are developing national strategies and policies to make this possible.

The size of these works highlights the difficulties of conducting global and national assessments. The *Conference on cost-effective biodiversity indicators to assess biological diversity in the framework of the Convention on Biological Diversity* points to the need for indicators of biodiversity, not only to monitor change, but also to conduct baseline surveys. The organisers concluded that:

'the impacts on biodiversity of these pressures [from changing land use] and policies are poorly understood and we therefore need ways of measuring them. The assessment of biodiversity is difficult. Full inventories appear to be the only way that biodiversity can be accurately measured but they are too costly and time-consuming.'

They also concluded that

- There is a need for multiple indicators because: 'there is a lack of common language when it comes to the concept and use of indicators in different fields / biota'; and 'indicators should be multiple and chosen to convince different stakeholders' (scientists may not choose the appealing animals which decision-makers latch on to);
- And indicators sets for biodiversity must also include aspects of ecosystem function and services. There was discussion about the implications of including function and process in the search for indicators, and the need to test correlations between indicators and diversity, or ecosystem function.

The latter has also been endorsed by the CBD Secretariat, which urges the 'ecosystem approach' (box 1). There is no precise definition of this approach but it emphasises the importance of processes and functions.

Box 1: The CBD on the Ecosystem Approach

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Application of the ecosystem approach will help to reach a balance of the three objectives of the Convention. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.

The United Nations Environmental Programme (UNEP), together with World Resources Institute and other major international institutions, are now coordinating the Millennium Ecosystem Assessment which links biodiversity and ecosystem assessment, and recognises the need for multi-scale, multi-stakeholder assessments (box 2).

Box 2: The Millennium Ecosystem Assessment

The Millennium Ecosystem Assessment (MA) is a four-year process, commencing in April 2001, designed to improve the management of the world's natural and managed ecosystems by helping to meet the needs of decision-makers and the public for peer-reviewed, policy-relevant scientific information on the condition of ecosystems, consequences of ecosystem change, and options for response. The MA will provide information and also build human and institutional capacity to provide information. More specifically, the MA will [among other aims]:

- Significantly increase understanding of the linkage between ecosystems and the goods and services they provide;
- Build human capacity and the capacity of global, regional, national and local institutions to undertake integrated ecosystem assessments and act on their findings;
- Support regional, national, and local integrated assessments that will directly contribute to planning and capacity-building needs;
- Develop methodologies to undertake cross-sectoral assessments and to effectively integrate information across scales.

1.3 Assessments by and with non-scientists

In addition to the focus on ecosystem assessment, there has been increasing interest in the involvement of non-scientists in biodiversity assessment.

Evidence from the available documentation and from workshop participants highlights several areas of experience:

- local resource users assessing biodiversity in order to participate in managing it;
- involvement of teachers and other laypeople in biodiversity assessment;
- volunteers from wealthy countries participating in biodiversity assessments in species-rich countries;
- members of 'the public' monitoring wildlife in their home countries;
- ethnobiologists 'cataloguing' local knowledge; these remain important at a time when there is a serious decline in resources available for taxonomy.

The first steps towards participatory monitoring of biodiversity in protected areas (PA) involve PA staff. There is evidence that local employees in protected areas are becoming involved in monitoring. In Bolivia, FAN, an NGO which has been authorised by the Bolivian government to manage the Noel Kempff Mercado National Park, has trained local park guards to contribute to a monitoring scheme; in Yunnan, China: in a case study posted on the workshop website, Jeannette van Rijsoort describes a collaborative project in which park wardens (and local villagers) monitor change in vegetation and wildlife.

Projects increasingly involve resource users, and from Thailand Steinmetz (2000) describes an approach to assessing, monitoring and conserving biodiversity which has been developed by the WWF/Thailand Programme Office in collaboration with the staff and local people of four protected areas in southern Lao People's Democratic Republic (Lao P.D.R.). Prof. Madhav Gadgil who has registered for this workshop has kindly made available a number of very significant documents on his website (Web sources box 3) describing a range of innovative projects in southern India. And a project managed by Pro-Natura (an NGO in Brazil) entitled 'Promoting biodiversity conservation and sustainable use in the frontier forests of northwestern Mato Grosso' began with a biodiversity assessment workshop in June 2001, which included local farm associations and government staff. The project aims to reduce pressure on the forest by facilitating participatory zoning.

Two other fields where relevant experience has been developed come from forestry: participatory forest inventory and forest certification. Biodiversity robustness of forest certification processes. Carey (2001, also see Web sources box 3) notes that 'In assessing the biodiversity robustness of a forest management system, it is paramount to also consider the three wider factors of the *socio-economic* issues and *political situations*, and *equitable benefit sharing*. We have not yet found work in which the indicators of biodiversity in forest certification or inventory are defined in a participatory way and we look forward to discussions on the feasibility of this.

There is clearly much activity, and we hope to learn more about the objectives and impact of these kinds of projects through the workshop.

Two organisations (Coral Cay Conservation, Raleigh International) which involve volunteers in biodiversity assessment have registered for the workshop and we would be interested to learn more about how indicators are selected and used, and the impact of this approach / utility for local people.

A different objective for participatory monitoring relies on stakeholders with leisure time and money for hobbies. Experiences from Europe and the US may provide some valuable insights (Web sources box 4):

- The British Trust for Ornithology has a Garden BirdWatch scheme whereby members send in reports of what they see regularly out of their windows. It would be interesting to know more about how BTO uses this data, and whether straightforward conclusions can be drawn from data which are collected non-systematically. Their Common Birds Census (based on volunteer but expert data gathering) has been used to show decline related to intensification of agriculture;

- The National Biodiversity Network trust (UK) is a ‘union of likeminded organisations that are collaborating to create an information network of biodiversity data that is accessible through the Internet. By providing easy access to the information people need about wildlife, wise and informed decisions can be made to ensure our natural environment is diverse, rich and sustainable now and for future generations;
- Butterflies are almost as popular as birds; in Europe and North America there are many schemes to involve amateurs in data collection. They are considered to be particularly useful indicators of environmental change.

Even where this work carries on, differences between indigenous systems of classification and scientific systems of nomenclature present significant challenges that have implications for many of the other ways in which biodiversity is measured, valued and assessed. Clearly ethnobiology has much to offer yet we do not find that participatory biodiversity assessments commonly involve ethnobiologists. Either the workshop will bring more cases to light, or we must discuss ways to enhance the contribution of this kind of knowledge.

1.4 Strategic training and data gathering

Some interesting examples have come to light which involve training local people in data gathering, not only for local purposes but as a resource for wider biodiversity planning and as a means to enhancing their status in decision-making (Web sources box 5). These include:

- a) Developing local capacity for biodiversity surveys in Papua New Guinea;
- b) People’s biodiversity registers;
- c) Empowering local people to manage the biodiversity of El Salvador.

Some of these projects are represented by participants in this workshop and we look forward to hearing more from them. Briefly, the projects are as follows:

a) Developing local capacity for biodiversity surveys in Papua New Guinea: The project aims to transform biodiversity surveys from an overseas-driven to a local activity, relying on local experts with access to national biological collections who can establish rapport with both local grassroots landowners and international research communities. A team of parataxonomists will be trained to (1) design and implement biodiversity surveys, (2) process and evaluate plant and insect samples, (3) produce high quality biological specimens, (4) document the specimens by digital photography, and (5) summarise the information in electronic databases, field guides, technical reports, education leaflets for grassroots landowners and www pages. The parataxonomists will become a fully localised source of expertise on biodiversity surveys, producing data and material for (inter)national nature conservation and sustainable forest use projects and national collections [information from Alan Stewart and Vojtech Novotny]. Information from this project will be available during the workshop.

b) The People’s Biodiversity Register aims to build an open and transparent information system on biodiversity resources from village level upwards. The register can be used to promote the sustainable management of natural resources and support claims of communities and individuals to knowledge about biodiversity resources and their use. Local NGOs are now supporting the use of such registers across India, and they have also been incorporated into the biodiversity policies of several states including Kerala and Madhya Pradesh.

c) Coffee and Biodiversity Conservation in El Salvador: in order to give people the necessary skills and know-how to maintain the balance between the conservation and sustainable use of the biodiversity of the coffee forest, the project trains scientists to teach the skills to assess and monitor forest activity; to establish an annual training course/workshop for coffee farmers, NGOs, policy makers and new scientists.

1.5 Biodiversity in the private sector

The CBD requires biodiversity to be taken into account in impact assessments and this has led to high demand from the private sector for guidelines on the subject. Papers on the subject are listed in Web sources box 6; none of these deal explicitly with participatory approaches but the CBD paper notes that 'relevant stakeholders or their representatives, and in particular indigenous and local communities, should be involved in the development of guidelines ... as well as throughout the assessment processes relevant to them' – clearly providing an important opening for participatory assessment and monitoring of biodiversity.

The more conventional methods that are widely used may have the consequence that impact assessments are overlooking critical local priorities, with important consequences for both biodiversity and community relations.

The last item in Web sources box 6, Impact assessment using participatory approaches, is relevant, although not explicitly a biodiversity assessment.

2 Values and biodiversity

This section relies more on academic research to summarise approaches to understanding the values associated with biodiversity. There is an enormous amount of academic literature associated with this area, from environmental ethics through ethnobotany to economics, and here is not the place to review it all. We simply summarise the issues based on reviews conducted by ourselves in the last two years.

Useful websites are given in Web sources box 7. The evidence is discussed in more detail in the following sections.

2.1 Values among scientists

Scientists dealing with biodiversity divide into two broad groups, the natural scientists (biologists, zoologists and ecologists) and the social scientists (economists, anthropologists, and sociologists), and each of these groups apply different value systems to their assessment of biodiversity. There is one further broad categorisation of values that is applied by both groups, which differentiates between values that stem from direct use of biodiversity and those that stem from indirect use or non-use values.

Natural scientists

Values held by natural scientists are by and large structured by value criteria concerned with rarity, 'naturalness' and the connectivity of habitats and vegetation types. In recognising the complexity of dealing with these kinds of values the UK's Natural History Museum seeks to find a 'fundamental currency of value to people' covering these different categories of value based criteria, in their formulation of 'genetic diversity' as the benchmark value:

"Because we do not know yet precisely which genes or characters will be of value in the future, first they must all be treated as having equal value, and second, the greatest value for conservation will come from ensuring the persistence of as many different genes or characters as possible, as a form of insurance."

For non-use values the natural science community has found it more difficult to apply value criteria, although these values are certainly recognised. As the World Commission on Protected Areas Network on Non-Material Values of Protected Areas asserts: 'it is the personal, gut-level knowing that motivates individuals and communities to actively cultivate harmony with the environment, and with one another. At the international level there has been a reluctance to make explicit, and promote the management of protected areas for non-material values. This is due, perhaps, to growing globalization of the western way of looking at the world that attaches singular importance to the scientific and technical, at the expense of the human, cultural, and spiritual.'

Social scientists

Within the social science community, the economists have led the development of explicit assessments of biodiversity. They have sought increasingly sophisticated ways to quantify values associated with biodiversity in the form of comparative money measures, which attach value to both use and non-use components of biodiversity.

The aims of economic approaches to the assessment of biodiversity are as varied as biological assessments. Some work has used economic analysis to demonstrate root causes of biodiversity degradation and loss, and other research attempts to justify the formulation of national biodiversity conservation strategies. The underlying values structuring these assessments are related to understanding the distribution of the costs and benefits of biodiversity and producing assessments which help decision makers to act for equitable outcomes in land use or resource use decision making. Although quantification of some biodiversity values expressed as monetary measures is important for underlining the costs of 'mining' natural capital and building better national accounting systems, it is not clear how economic assessments have helped to set biodiversity priorities in the specific context of implementing CBD targets (but see Web sources box 7).

A continuing and significant limitation of economic approaches is the fact that valuation of biodiversity is often based on the assumption that biological resources are "*the physical manifestation*"² of biodiversity. Thus, the value of biodiversity has often been taken as equal to that of the value of biological resources. It has been difficult to assess and evaluate the additional benefits of *diversity* over and above the value of the resources themselves, and this can mislead decision outcomes. We mention the resilience of a biodiverse ecosystem as just one example.

The CBD recognises that some components of biodiversity are of more immediate importance than others, and its own values are implicit in the priorities listed in Annex I. of the convention, on identification and monitoring (box 3).

Box 3: Priorities for monitoring listed in Annex 1 of the CBD

- Ecosystems and habitats: [those] containing high diversity, large numbers of endemic or threatened species, or wilderness; required by migratory species; of social, economic, cultural or scientific importance; or, which are representative, unique or associated with key evolutionary or other biological processes;
- Species and communities which are: threatened; wild relatives of domesticated or cultivated species; of medicinal, agricultural or other economic value; or social, scientific or cultural importance; or importance for research into the conservation and sustainable use of biological diversity, such as indicator species; and
- Described genomes and genes of social, scientific or economic importance.

2.2 Research identifying, comparing or 'translating' local values

A review of the different ways in which research has explored value-based information from local stakeholders (Lawrence and Ambrose-Oji, 1999), shows that participatory biodiversity *evaluation* had built largely on the traditions of ethnobotany and participatory rural appraisal (PRA). By and large these have focused attention on the uses of biodiversity resources by local communities, whether this is qualitative knowledge such as information about the medicinal uses of plants and animals, or a more quantitative appreciation of what is being used by whom, to what degree and at what this means in terms of the financial contribution biodiversity makes to local livelihoods.

The objectives for biodiversity assessment based on local values have been linked to: participatory or collaborative conservation management, poverty alleviation (see Web sources box 7, Biodiversity in Development project) and economic development (Web sources box 7, economic assessment of biodiversity). However, there are limitations as to how far local

² McNeely (1990) cited by Aylward (with emphasis added) : "Biological resources – genes, species and ecosystems that have actual or potential value to people – are the physical manifestation of the globe's biological diversity".

values are incorporated beyond supplying local price data (or similar measures), or the categorisation of indirect or intangible values, and many of the published economic studies bemoan the paucity of empirical data on which to base their calculations.

The review by Lawrence and Ambrose-Oji concluded that there were methodological and technical gaps in the way knowledge about biodiversity values was collected, transformed and utilised. The most important of these that need to be addressed are:

- The need for assessment approaches to explore local non-utilitarian values in a way that can be applied to quantitative biodiversity target setting and policy formulation;
- The need to include groups of people who have a stake in biodiversity use and management but are traditionally ignored by decision-makers;
- Linking together values attached to different components of biodiversity along the genes-species-habitats-landscape continuum. Do they add up to each other, or to more than the sum of parts.

Such work keeps the emphasis squarely on use values. In industrialised countries 'the public' has been involved in some sophisticated biodiversity assessment schemes, but there seems to be a gap between the kinds of information and kinds of techniques 'local' people in tropical countries are perceived as being able to manage intellectually (although this is addressed in other areas such as forest resource assessment; see for example Carter, 1996). The result is that local values other than the utilitarian are poorly incorporated if at all, and often in a form that is not useful to those who are trying to make decisions related to the CBD.

Although there is value in producing lists of the different products being used by various groups in particular communities, and being told these have a cultural or other loosely defined value attached to them, there is a distinct need for more quantitative assessments that decision makers and policy makers will actually feel have direct relevance and value to the kinds of decisions they are taking within the CBD framework. Research that tries to incorporate use values with indigenous concepts of what might be rare, important, or culturally significant, in a form that provides the quantitative and spatial data useful to decision makers and planners is very rare.

However recent attempts to do this have been supported by the UK Department for International Development³. Representatives of all the following projects are participating in this workshop and we look forward to discussion on the implications of the results.

- a) *Development and promotion of improved methods for identification, assessment and evaluation of biodiversity for tropical mountain environments* (University of Wales, Bangor, UK):

Some results from this project are available from a paper on the workshop website (*Exploring local values for forest biodiversity on Mount Cameroon*), which concludes 'As expected, many of the values were use values, but the analysis ... suggested that a local concept of diversity *per se* is related to usefulness of a habitat. ... people explicitly appreciated diversity of species and of habitats, because it provided them with all the things they needed for their existence. [The] results suggest some fundamental differences between the appreciation of diversity, and the knowledge of useful species by forest users.'

The project has also developed matrix scoring methods to explicitly compare forest users' values for species, with scientists' values.

- b) *Conservation through use of Tree Species Diversity in Fragmented Mesoamerican Dry Forest* (Oxford Forestry Institute, Overseas Development Institute).. The project involves botanical survey, socio-economic farm surveys and economic valuation studies to quantify and analyse the socio-economic, economic and conservation values of tree species in these areas.

- c) *An Integrated Approach to Assessing, Conserving, and Managing Amazon Forest Biodiversity* (University of Leeds, UK). Use of participatory ethnobotanical methods led to the

³ Forestry Research Programme, Environmental Research Programme and Natural Resources Systems Programme.

conclusion that non-commercial values of species may contribute more to the livelihoods of forest extractivists than do commercial values, and highlights the need for studies which explore *change* in values, as resources, markets and policy change.

d) A study by Hellier et al. (1999) (also abstract: Web sources box 8) used a variety of rapid rural appraisal (RRA) and participatory rural appraisal (PRA) techniques, including semi-structured interviews, transect walks and participatory mapping. These approaches were used in conjunction with analysis of land use maps and aerial photographs to evaluate recent changes in vegetation cover and abundance of utilised species.

All of these have provided valuable insights into the differences between scientific and local perceptions of biodiversity, although with different approaches to place values within an externally determined biodiversity framework. It is one objective of this workshop to draw common conclusions from this work.

All of the above work was to some extent designed and analysed by outside researchers (although in some cases results have deliberately been returned to the community). One project aimed to analyse biodiversity values within a locally-created participatory monitoring and evaluation process:

e) *Development of monitoring process and indicators for forest management, Nepal* (University of Reading, UK). Tentative conclusions from this project include

- Biodiversity is important to community forest managers, but it was not explicitly addressed in the early stages of PM&E systems;
- It is useful to explore biodiversity values through its component parts (species, ecosystems, processes etc.);
- Participants commented on the fact that the method led to increased consideration of BD values, and changed awareness; if communities were supported in follow-up, it could lead to changes in management;
- The kinds of value most in evidence are direct use values, followed by indirect use, and option values where rights are secure. Existence value was rarely mentioned, and the utilitarian focus is more marked than in other traditional cultures studied;
- Poorer people focus only on use values; only elites hold option values, in relation to biodiversity; often co-opting outsiders values for political gain.

Clearly there is a need to find the common ground among different participatory biodiversity assessments, and explain some of the differences which arise.

3 Methods and tools

In this section we consider the ways in which different stakeholders have set about gathering biodiversity information. Because the workshop is about *participatory* assessment, we do not take into account scientific approaches where these stand alone; we are instead looking for methods and tools suitable for *non*-scientific stakeholders, and for scientists to work with such people. Useful websites are listed in Web sources box 8.

There are different ways in which these have been developed. Some explicitly recognise that assessment is value-laden, others expect local stakeholders to measure the components of biodiversity which are valued by scientists, or by national planners. Some are methods developed by researchers to better understand local values or perceptions. Many rely on adaptations of PRA (participatory rural appraisal) methods.

Many of the methods which have been developed are not yet available either on the internet or in published form. We have summarised here, our own experience from collaborating in several research projects which specifically attempted to develop tools for understanding local forest users' values for and measures of biodiversity. The collaborators in those projects are participating in this workshop, and we look forward to contributions which briefly document methods. We believe that this scarcity in the literature highlights a need for greater

documentation and dissemination of methods, particularly in a user-friendly format rather than in academic publications.

Our rapid overview of available materials suggests that there is still a need to discuss the strengths, weaknesses, and difficulties of the various methods, and to address the following questions (among others):

- Comparison with scientific methods – are processes which engage local stakeholders more or less rigorous or quantitative?
- Should they be?
- Is it a myth that local people / the public can not handle more complex forms of assessment? Or produce information and data of reliable quality?
- What is needed to support this – training, resources, facilitation, improved communication?
- What form is the data in? (*see next section*)

Biodiversity economics has provided some tools for exploring local values. A case study contributed to this workshop illustrates ways in which contingent valuation, used in combination with focus group discussions, helped to reveal values associated by the British public with forest biodiversity (ERM in Web sources box 8).

The approach used to prepare People's Biodiversity Registers, already mentioned in section 1.4 above, has been documented in a draft manual. The approach involves helping the population in the chosen area develop a systematic understanding, followed by mapping, historical analysis, and negotiation of consent to document and use the knowledge gained.

Winfred Thomas, a workshop participant, describes a collaboration between the Western Ghats Biodiversity Network and The American College, Madurai, in India. The process begins with mapping of the resource base and developing a database: 'With the help of grassroot level traders who collect non-timber forest products (NTFP) we were able to develop crude landscape maps indicating the collection spots, land uses, and the type of vegetation. The data collected from this area gave us a broad picture on the intensity of collection of specific NTFP and the period of collection. We are constructing a data base on the pattern of NTFP collection, trade route and trying to predict the impact of various factors like monsoon, market demand, availability of NTFP at a given landscape or collection spot etc.'

Steinmetz (2000) also outlines some of the methods used, including village logbooks and joint monitoring teams of local naturalists and conservation staff to reveal 'details ... on wildlife-habitat relationships, the diversity of habitat types, and ecological processes from both historical and seasonal perspectives. The results of these assessments and subsequent field surveys are returned to the local communities using graphic posters and maps, and allowing local interpretations of data to help advance a mutual understanding of conservation issues facing the protected area. This approach facilitates positive relationships with local people while establishing a process for integration of local ecological knowledge, and ecological monitoring of key species of large mammals and birds. Local people, if given the opportunity to discuss survey findings and observations, often provide interpretations and insights that otherwise may have been missed were the results interpreted solely by staff and advisors.'

4 Information needs of different actors

This section deals with the ways in which information needs of different stakeholders in biodiversity assessment have been defined. It is a short section as we found little explicit discussion of this (which does not mean to say it does not exist). Useful websites are listed in Web sources box 9.

One study, entitled 'Focusing Biodiversity Research on the Needs of Decision Makers' concludes:

'The information needs articulated by decision makers revealed no surprises, except perhaps expressions of readiness by U.S. decision makers at the national level to implement steps to manage for biodiversity. The majority of the decision makers interviewed were concerned with

terrestrial and aquatic natural resource conservation and management. However, they recognized that there is less biodiversity information available on marine and freshwater aquatic systems.'

And an interesting initiative in the UK aims to make species and habitat data widely available. The National Biodiversity Network notes that 'Gathering biodiversity information of the United Kingdom, though enjoyable, is time consuming and labour intensive. Information is of little use unless it is used so knowing that it exists and where to access it is essential. Ideally information should be recorded once, be widely available and used repeatedly to have the greatest value.'

Its approach is about making the data available to the user, and the NBN considers who such users of biodiversity information might be: 'You could work in government formulating the policies that will steer our use of the UK's land and seas. You could be a planner who wants to know if an area should be protected and how significant it might be in the greater scheme of things. You could be a manager of the countryside who wants to judge how to sustainably develop an area. You might be an industrial company, or a road engineer, seeking to build in environmental protection at an early stage into your development planning. You might be a teacher wanting to introduce your class to the natural world that surrounds them, either for its own sake, or as a method of teaching maths or English. You might be a member of the public who wants to be more involved in deciding on the future of your neighbourhood. What you all share in common is a need for information.'

All of this represents progress in recognising the need for data, but the emphasis is on quantitative (or quantifiable) scientific information. In contrast, Steinmetz (2000) notes 'The focus on both cultural and ecological data helps to illuminate points of intersection or domains where existing local practices of resource use or belief come together with protected area priorities.'

We feel that there is further need to explore the form, function, limitations and feedback loops associated with the data acquired through the methods described in the previous section.

Thinking about the different users of biodiversity information, we can ask:

- *What information do they need to help them in their tasks?*
- *Do the data being produced match these needs? If not why not?*
- *What are the bottlenecks and constraints to producing useful and relevant information? Are they technical / methodological / process based? Are they financial? Or are they related to lack of institutional will and commitment to 'publicly' gathered and structured data?*

5 Potential for synergy

This is where we come to the crux of the workshop: is it possible to conduct biodiversity assessments with multiple stakeholders, such that all benefit?

Little has been written about this and we feel that it is here that the workshop has most potential to contribute to exciting new possibilities. In order to achieve synergy we feel three issues have to be addressed:

- The communication pathways and mechanisms between stakeholders;
- The costs and benefits for those involved in sharing data;
- Issues of politics and power relations (relevant, although difficult to tackle);
- Issues of institutional inertia and development.

Useful websites are listed in Web sources box 10.

There is a general feeling that scientific and local assessments of biodiversity are complementary, and that taken together they are more valuable than conducted alone. But this assumption is questionable and its validity may be highly context specific. Two or three detailed case studies reveal that processes which truly try to integrate assessments, or share biodiversity information between different stakeholders, encounter a number of pitfalls, and advantages. Some of the participants in this workshop have also sent in comments which are

thought provoking here⁴. We hope that the workshop will address these in more detail, and look forward to practical solutions.

In doing so we need to consider the ways in which different stakeholders could gain or lose out. Such considerations are particularly important for the rural poor in developing countries who are often seen as a source of information and labour, but do not always see the rewards of such contributions. In relation to the People's Biodiversity Registers (Utkarsh, 1999; also website in Web sources box 5) notes that 'availability of easily accessible databases could encourage the over harvesting of certain biodiversity resources by the communities themselves; and that information on biodiversity resources might be used by those who are not prepared to share the benefits equitably'.

Other key risks and costs which have been highlighted in contributions from workshop participants include:

- the extra time required for monitoring; in developing countries rural people are often very busy maintaining a livelihood for themselves and have little extra time to gather data for purposes not immediately beneficial to themselves;
- while there might be benefits for local people these may only appear in the longer term;
- if empowerment is one of the objectives of the participatory work, there may be serious equity issues affecting access to and use of biodiversity; common property resources are often most important to the poor but they may be the ones least able to spare time (or knowledge) for participatory work;
- overcoming poor relationships between stakeholders; one participant mentions that foresters in the area where she works view local villagers as 'backward and not educated' without potential to contribute to biodiversity assessments.

On the other hand, possible benefits include increased awareness, pride in ownership, and enhanced ability to improve management strategies or even control illegal or unwanted activity. Turning again to the case of the People's Biodiversity Registers (Utkarsh, 1999) specifically notes that

- The medicinal and seed industries are allowed access to [the databases of local biodiversity knowledge] for a reasonable fee. Some of the royalties accumulated in this way have been deposited in biodiversity funds for the support of local initiatives;
- The registers were accepted by local councils as official documents and distributed publicly. This ... helped raise awareness about these issues in neighbouring areas, and ... worked as a signal to local politicians about the importance of local resource management and their responsibilities towards it.

These questions depend of course on the objective of the assessment. But where local knowledge is seen as a short cut to understanding large-scale trends, to aid national or regional planning processes, there is a risk that local knowledge may be seen

Hellier *et al.* (1999) illustrate this. Although they were assessing the value of indigenous knowledge as a source of information about biodiversity trends, they note that 'the contradictions recorded between assessments of vegetation change by local people and data obtained from other sources indicates the need for caution in the use of indigenous knowledge for this purpose.' Is the problem in the methodologies used (i.e. do participatory methods genuinely capture local people's perceptions of resource abundance and diversity?) or is there a real difference in perception? In which case, what is the explanation for this difference, and are there ways in which science can contribute to more accurate resource assessment?

We are not suggesting that when local and scientific knowledge differ, it is the scientists who are always correct. There is always much of interest in the reasons for the difference of perception. However there appears to be a tendency for information to flow in one direction when conducting participatory assessments. Is there a way in which scientific information on the biodiversity resource could be made more accessible to and useful to local people?

⁴ Thanks to Jeannette van Rijsoort, Richard Barnes, ... for personal communications.

Alternatively, if there is value in integrating local knowledge into large scale assessments where the data may not be directly of use to the local people themselves: is there a SMART procedure (simple/specific, measurable, attainable, relevant and trackable) which helps us to engage with local people in a way that makes it clear what the job is and allows clear payment for work done or benefits shared, *and* still gives room for adaptation of indicators to include locally generated values?

If these advantages are to be achieved, there will need to be effective communication linkages both vertically and horizontally. We have not seen an analysis of these issues in the work available to us and expect that it will be an important focus of the workshop, to examine the relations between suppliers and users of information, influencing factors, and ways in which linkages can be both supported and protected from misuse.

6 Enabling factors

Taking into account recommendations arising from previous themes, we would like to focus the last few days of the internet workshop on the institutional environment, i.e. policy, institutions and communication. This will lead into one of the most challenging issues that the workshop must address, that of institutional and political enabling factors. This seems to be uncharted territory and it is here that the workshop has a real opportunity to develop valuable recommendations based directly on the experience and reflections of participants.

Table 1. Relevant clauses of the CBD

Article	Title	Relevant clauses
7	Identification and Monitoring	(a) Identify components of biological diversity important for its conservation and sustainable use having regard to the indicative list of categories set down in Annex I; (b) Monitor, through sampling and other techniques, the components of biological diversity identified pursuant to subparagraph (a) above, paying particular attention to those requiring urgent conservation measures and those which offer the greatest potential for sustainable use; (c) Identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity, and monitor their effects through sampling and other techniques; and (d) Maintain and organize, by any mechanism data, derived from identification and monitoring activities pursuant to subparagraphs (a), (b) and (c) above.
8	In-situ Conservation	(j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices;
10	Sustainable use of components of biological diversity	(c) Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements; (d) Support local populations to develop and implement remedial action in degraded areas where biological diversity has been reduced.
14	Impact assessment and minimising adverse impacts	(a) Introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects and, where appropriate, allow for public participation in such procedures [our emphasis
17	Exchange of information	2. Such exchange of information shall include exchange of results of technical, scientific and socio-economic research, as well as information on training and surveying programmes, specialized knowledge, indigenous and traditional knowledge [emphasis added].

Web sources: links to key discussion and information sites

Box 1. Some definitions of biodiversity

For the official CBD definition of biological diversity (biodiversity):

<http://www.biodiv.org/convention/articles.asp?lg=0&a=cbd-02>

What is biodiversity? Two articles on the Biodiversity Center's website:

<http://www.defenders.org/bio-bi00.html>

Box 2. Biodiversity assessment

The Global Biodiversity Assessment is described at

<http://www.wri.org/biodiv/gba-unpr.html>

Cultural and Spiritual Values of Biodiversity, ed. Darrell Posey. The book is described at

<http://www.unep.org/Biodiversity/>

and can be downloaded from the same site – but be warned – it is 25 MB!

Conclusions from the Conference on cost-effective biodiversity indicators to assess biological diversity in the framework of the Convention on Biological Diversity

<http://www.gencat.es/mediamb/bioassess/bacontr1.htm>

and the full proceedings at

<http://www.gencat.es/mediamb/bioind/bioind.pdf>

Definition and principles of the 'ecosystem approach' (see especially pp. 32-38):

<http://www.biodiv.org/doc/handbook/cbd-hb-10-05-en.pdf>

The Ecosystem Approach under the CBD, from concept to action – report of an IUCN / UNESCO-MAB partnership

http://www1.rhnc.ac.uk/rhier/cem/SEAsia_report.doc

The Millennium Ecosystem Assessment:

<http://www.millenniumassessment.org/en/index.htm>

European Biodiversity Monitoring and Indicator Framework (EBMI-F) - <http://www.strategyguide.org/ebmf.html>

An initiative led by ECNC and EEA that aims at enhancing European monitoring and indicator efforts and to creating a stronger linkage to European biodiversity policies. It is closely linked to the implementation of the Pan-European Biological and Landscape Diversity Strategy.

Box 3. Involving communities and local stakeholders in biodiversity monitoring

Summary of 'Ecological Surveys, Monitoring and the Involvement of Local People in Protected Areas of Lao PDR' by Robert Steinmetz

<http://www.iucn.org/themes/pmns/community/stein.html>

Biodiversity in Development: Guiding Principles

http://wcpa.iucn.org/pubs/pdfs/biodiversity/biodiv_brf_17.pdf

Promoting biodiversity conservation and sustainable use in the frontier forests of northwestern Mato Grosso

www.pronatura.org.br/en/projects/gef

Madhav Gadgil's publications, made available for this workshop: on his website, at

<http://ces.iisc.ernet.in/hpg/cesmg/workshop.htm>

Biodiversity robustness in certification (Carey, 2001):
<http://biodiversityeconomics.org/business/topics-101-00.htm>

Box 4. Involving volunteers in biodiversity monitoring

British Trust for Ornithology - Garden BirdWatch scheme

<http://www.bto.org/gbw/gbwhome.htm>

see also their page on monitoring and survey:

<http://www.bto.org/survey/ipm.htm>

The National Biodiversity Network:

<http://www.nbn.org.uk/>

The Butterfly Monitoring Project:

<http://www.im.nbs.gov/butterfly/nabmp.html>

The monitoring scheme for butterflies as bioindicators of environmental quality in Catalonia

<http://www.gencat.es/mediamb/eng/pn/2ropalocers.htm>

The UK Butterfly Monitoring Scheme

<http://www.bms.ceh.ac.uk/>

Box 5. Strategic training and data gathering

Developing local capacity for biodiversity surveys in Papua New Guinea

<http://www.darwin.gov.uk/projectpages/10030.html>

and the Parataxonomist Training Center

<http://www.entu.cas.cz/png/index.html>

People's biodiversity registers are described at:

<http://www.oneworld.org/ileia/newsletters/15-34/28.pdf>

See the draft People's Biodiversity Register manual on:

<http://ces.iisc.ernet.in/hpg/cesmg/pew/srusti.html>

Empowering local people to manage the biodiversity of El Salvador

<http://www.nhm.ac.uk/botany/coffee/projectmain.html>

Box 6. Guidelines and indicators for biodiversity in environmental impact assessment

Environmental Risk Assessment for European Agriculture (ENRISK) –

<http://www.ecnc.nl/doc/projects/enrisk.html>

An EU concerted action that test agri-environmental indicators for their use for environmental risk assessments. One component is on (agri)biodiversity. See also previous work on this on developing agri-environmental indicators (ELISA –

<http://www.ecnc.nl/doc/projects/elisa.html>)

Indicators and Environmental Impact Assessment:

<http://www.biodiv.org/doc/meetings/sbstta/sbstta-07/official/sbstta-07-13-en.pdf>

Clare Brooke: Biodiversity and Impact Assessment

<http://biodiversityeconomics.org/pdf/topics-03-01.pdf>

and a methodology for participatory impact assessment ('starter pack' and sustainable agriculture in Malawi, Cromwell *et al.* 2001) is described at:
http://www.odi.org.uk/agren/papers/agrenpaper_112.pdf

Box 7. Biodiversity values

Measuring biodiversity value: a paper by the UK Natural History Museum presenting their own view, and with valuable links to other scientific perspectives
<http://www.nhm.ac.uk/science/projects/worldmap/diversity/index.html>

World Commission on Protected Areas network on 'non-material values of protected areas':
<http://wcpa.iucn.org/network/values/values.html>

Good example of an economic assessment of biodiversity:
<http://biodiversityeconomics.org/assessment/topics-504-00.htm>

and a workshop where aspects of economic assessment are considered in relation to targets for the CBD:

<http://biodiversityeconomics.org/incentives/010620-01.htm>.

International Workshop on Biodiversity and Economics

The Biodiversity in Development Project:
<http://www.wcmc.org.uk/biodev/index2.html>

and two papers which are available on the workshop website:

<http://www.etfrn.org/etfrn/workshop/biodiversity/index.html>

ERM (1996) Valuing Management for Biodiversity in British Forests: A Synopsis.

Lawrence, A., B. Ambrose-Oji, R. Lysinge, and C. Tako. 2000. Exploring local values for forest biodiversity on Mount Cameroon. *Mountain Research & Development* 20(2):112-115.

Box 8. Methods and tools

Biodiversity Economics
<http://biodiversityeconomics.org/incentives/010620-01.htm>

On the workshop website
(<http://www.etfrn.org/etfrn/workshop/biodiversity/documents.html>)

ERM (1996) Valuing Management for Biodiversity in British Forests: A Synopsis.

Assessing the Sustainability of Uses of Wild Species: Case Studies and Initial Assessment Procedure by Robert and Christine Prescott-Allen
<http://biodiversityeconomics.org/assessment/topics-502-00.htm>

The abstract of: Hellier A *et al.* (1999)
<http://kapis1.wkap.nl/oasis.htm/192160>

The draft People's Biodiversity Register manual:
<http://ces.iisc.ernet.in/hpg/cesmg/pew/srusti.html>

The World Bank toolkit on biodiversity and EA.
<http://lnweb18.worldbank.org/essd/essd.nsf/f308a5a687dbdec8852567eb00658cb7/a45ed771361d5f08852568dd0064d5a0?OpenDocument>

Campbell, Bruce and Marty Luckert (eds) (in press) *Uncovering the Hidden Harvest: valuation methods for woodland and forest resources*. Earthscan, London. See announcement on: <http://www.rbgkew.org.uk/peopleplants/manuals/valuing/index.html>

An outstanding example of the impact of participatory research into biodiversity assessment (Shanley, 1999) is given at: <http://www.fao.org/docrep/X2161E/x2161e10.htm>

and a key document discussion Participatory Monitoring and Evaluation methods: <http://www.eldis.org/participation/pme/index.htm>

Box 9. Information needs

Focusing Biodiversity Research on the Needs of Decision Makers
<http://www.rand.org/scitech/environment/publications/burn.html>

Not specific to biodiversity but useful in this context are:

Dating the decision-makers.
http://www.iisd.org/pdf/2001/networks_engagement.pdf

Whose decision is it anyway? A paper prepared by Life II for Rio +10
<http://www.earthsummit2002.org/es/life/Decision-making.pdf>

Box 10. Synergy

Summary of 'Ecological Surveys, Monitoring and the Involvement of Local People in Protected Areas of Lao PDR' by Robert Steinmetz
<http://www.iucn.org/themes/pmns/community/stein.html>

Tyranny of participation:
<http://www.id21.org/zinter/id21zinter.exe?a=0&i=S4brh1g4&u=3ef9ae93>

Discussion of the possible dangers of making information too accessible in an article on People's Biodiversity Registers:
<http://www.oneworld.org/ileia/newsletters/15-34/28.pdf>

The Guidelines for integrating indigenous knowledge in project planning and implementation by Alan Emery with support from the ILO, World Bank, CIDA and KIVU Nature Inc. are highly tested and acclaimed according to their website:
<http://www.kivu.com/wbbook/ikhomepage.html>

They have produced separate sets of guidelines for indigenous communities, 'proponents' (i.e. representatives of outside bodies such as corporations) and governments. Although not specific to biodiversity they provide a valuable framework within which to conduct this type of work.

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