THE UNMEASURABLE WHOLE: ASSESSING FOREST BIODIVERSITY WITH MULTIPLE STAKEHOLDERS

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Abstract

Forest biodiversity conservation and management require knowledge of the resource, a particularly challenging agenda when multiple stakeholders are involved. The expectations of participatory assessment methods are high, and the paper draws on experience from 55 countries shared through an internet conference, to explore the potential for synergy through multi-stakeholder participation. Recognizing the different cultures, livelihood contexts and information needs of different stakeholders, it notes that biodiversity can only be known partially and subjectively, even by science. This makes the choice of indicators important as a means of improving mutual understanding between stakeholders about the components of biodiversity that are recognized and valued by each. To move beyond understanding to action, through data that is useful to different stakeholders, requires comparison and matching of information at different scales by extrapolation and generalization from detailed but localized information; and procedures to combine different *types* of information in a usable way. Costs of this approach include time, and potentially loss of local motivation if appropriate benefits are not realized. Flexible participatory research processes, which concentrate on explicitly recognizing values of other stakeholders and the complementarity of different information types, are important. It is a high priority to develop protocols within specific institutional contexts, to motivate the participation of more bureaucratic agents. But it is still all too easy to overlook the challenge of cultural and power differences, and whilst recognizing the value of enhancing qualitative and quantitative data exchange between stakeholders, the paper advocates an approach which focuses less on data collection and translation, and more on involvement of stakeholders in processes that are meaningful to themselves, combined with periodic sharing with other stakeholders, to support assimilation of new experience into decision-making processes.

Introduction

In order to manage biodiversity, we have to understand what that biodiversity consists of and how it changes in response to management and other influences. Assessment, monitoring and evaluation are therefore essential tools. But each of these is susceptible to the perceptions, knowledge and values of the person doing the assessment; when multiple stakeholders are involved, each has their own vision and priorities for its management, and finds it difficult to understand information communicated by other stakeholders. In the forestry context the ever-wider range of stakeholders make assessment a particularly urgent challenge, as international agreements and national biodiversity action plans bring extra information demands.

Participatory approaches are often hailed as a solution, and can enhance forest management decisions because stakeholders are both better motivated (through the participatory *process*), and better informed (by more relevant and meaningful *data*). But expectations that participatory assessment, monitoring and evaluation of biodiversity (PAMEB) can meet all stakeholders' objectives through a single process, are difficult to meet. This paper explores the potential for synergy through multi-stakeholder participation.

Methods

In January 2002, the European Tropical Forest Research Network hosted an internet workshop (www.etfrn.org/etfrn/workshop/biodiversity.html) to share experience of PAMEBs, analyse the aims and achievements of different stakeholders, and assess whether there are ways in which PAMEB can provide benefits for all the main stakeholders.
The 270 registered participants, based in 55 countries, included development practitioners and researchers working with rural communities; local and national planners, international NGOs, donors and members of the Convention on Biological Diversity (CBD) Secretariat. This experience provides key lessons about the utility of PAMEBs for different stakeholders.

Results and discussion

Different forest stakeholders have different biodiversity information needs. The problem arises when one (or more) sets of stakeholders are expected to provide for the information needs of another, without fully appreciating the practical, cultural and ethical challenges involved (table 1). The diverse (and often implicit) expectations of PAMEB include:

1. communities near protected areas assist in monitoring ecological status;

2. communities manage natural resources by assimilating scientific knowledge;

3. local knowledge contributes to national biodiversity planning.

Table 1. Differences of knowledge and information needs between stakeholders which emerged through case studies and discussion during the internet conference. A typology to illustrate the difficulties of participatory information exchange.

Stakeholder group	Characteristics of knowledge	Information access	Information needs (i.e. information about *what)*	Characteristics of information needed
A. Forest users	Detailed, localised and location-specific; culturally specific values; often based on uses; qualitative, or	Through observation and word-of-mouth; local; unsystematic and sometimes	Availability and location of useful resources and/or culturally	Trustworthy, comprehensible in local terms, relevant to specific location.

	incorporates perceived *trends* which may be quantifiable.	secret.	significant species or habitats.	
B. Conservationists	Claims of scientific objectivity offset by debates over values (including emotional and aesthetic) (Jepson and Canney 2001).	Through field observation and scientific literature; more detailed in ecologically important areas.	Size and dynamics of 'important' species populations and habitats.	Focused on priority areas and species; often systematic within those areas; 'scientific', 'objective', validated and reliable.
C. National planners	Assumed to be objective; quantitative; often inaccurate or over-generalised; based on statistical data collection methods.	Secondhand, patchy, under-resourced; bias towards protected areas.	Whole country; whole resource.	Systematic, standardised, comparable over national scale; quantified.

Forest stakeholders differ not only in their livelihood goals, resource use and access, and biodiversity information needs, but also in their values and perceptions related to biodiversity, and the epistemological basis for constructing a worldview which includes biodiversity. Science as a culture makes strong claims for objectivity, but this is widely undermined by the political and value-laden nature of scientific *practice* (Bijker et al. 1987; Castree and Braun 1998; Jepson and Canney, 2001). Other knowledge systems make no such universal claims, but may contribute richness and be more ecologically adaptive (Rappaport 1979). But without self-awareness that one's own perspective is culturally situated, it is difficult for stakeholders to understand and use each others' assessments.

Biodiversity, despite its apparently clear-cut scientific definition (McNeely et al. 1990), is impossible to measure as a whole. Because the definition includes processes or interactions between the components, and also because of other less definable emergent properties, the whole *is* more than the sum of the parts, and indicators will always overlook some of the spiritual, emotional or aesthetic significance of a diverse natural system.

Furthermore, the logistical challenges of including all components, and the subjective nature of observation, ensure that *any* biodiversity assessment, by scientists or others, includes only some subset of all biodiversity. Decisions must be made about *which* components are to be measured and what they tell us about the whole (or the part that we are interested in). This observable subset of biodiversity components, or 'indicators', is particularly useful in monitoring *changes* in biodiversity. Even among different scientific fields the choice of indicators is a contested issue and PAMEB adds a further dimension to the debate, in that the choice of indicators must be made by, or interesting to, the local stakeholders, but must also have a clear relationship to the whole.

More pragmatically, different stakeholders require information at different scales. This requires extrapolation and generalisation from

information collected by local who have detailed but localised knowledge; and procedures to combine different *types* of information in a usable way. At the wider scale, this can lead to complex heterogeneous sets of data from different sources and in different formats. Simple standardised data make decisions easier, but may be misleading for policy-makers (Sheil and Wunder 2002), and irrelevant or meaningless to local stakeholders.

The *costs* of participation are not always fully appreciated. The principle cost is *time:* participation is not a quick fix for anyone, especially for local people. The great majority of experience contributed to the ETFRN conference indicates that PAMEB is powerful at the local level, but extractive (or exploitative) when conducted for more regional or national planning needs. Even where PAMEB is expected to be useful to local people, the novelty of the exercise, and time needed to develop methods, make it advisable to offer cash incentives (Rijsoort and Jinfeng 2002).

Looking beyond these findings, ways to enhance the value of PAMEB at local and regional levels include the following.

Time to establish trust. Considerable effort is needed to overcome negative preconceptions, communication difficulties, and power differences between stakeholder groups.

Co-learning. Values can change through participation in a PAMEB, both by becoming more conscious of one's own relationship with biodiversity and through increased understanding of other stakeholders' values. This can enable scientists to act as advocates for indigenous forest managers (Sheil et al. 2002). Conversely, local people want to learn about scientific approaches and global values applied to their local resources. In Cameroon, externally-initiated research into local biodiversity values led village chiefs to request help in documenting local species names and uses (Wong et al. 2002b), while in Canada such information was incorporated more implicitly into indigenous resource management (Davidson-Hunt and Berkes 2001).

Flexibility in methods. The wide range of possible stakeholders in a PAMEB precludes a prescriptive methodology. Instead each PAMEB needs tools appropriate to the objectives and stakeholders, taking into account the need for results to be used by different stakeholders.

Making values explicit. Notwithstanding the huge contribution of environmental economics, a much wider range of methods is needed to move beyond the assumptions that such methods relate to local people's realities. A review of two well known studies of forest value concludes '[they] confuse local perceptions with a limited economic statement of value that involves the judgement and choices of a third party (the researchers)' (Sheil and Wunder 2002). Studies in Cameroon, Philippines and Indonesia all moved beyond the utilitarian stereotypes, and found wide range of local biodiversity values including aesthetic, existence, religious and service values (Lawrence et al. 2000; Lawrence 2002; Sheil et al. 2002).

Incorporating qualitative data. Values for a given species or habitat are composite (Lawrence et al. 2000; Wong et al. 2002a), location specific (Davidson-Hunt and Berkes 2001) and not always quantifiable in a meaningful way. Qualitative approaches not only express other attributes, they can also help to *explain* changing phenomena, providing insights which scientists and planners would not have otherwise had access to (Sheil et al. 2002). Combining

these different *kinds* of information is especially helpful through maps, which link species and landscape values with place.
However scientists are reliant on quantitative standardised approaches to ensure reliability and generalisability, and the types of qualitative, subjective and/or location specific data generated by a PAMEB may be dismissed by planners, economists and biologists. There are three possible ways to reassure them:

- impose a sampling framework, with standardised data collection; but PAMEB organisers should be aware that this will bring a loss of information richness, and of local meaning;

- conduct parallel assessments and compare findings from different stakeholders; correlations would make it possible to rely more directly on community information sources without such detailed scientific checking, whilst even without clear correlations great detail and meaning is given to the scientific data (Rijsoort and Jinfeng 2002; Sheil et al. 2002; Stockdale and Ambrose 1996)

- accept different levels of detail, stakeholder diversity and participation in different parts of the large (national or regional) area; complement scientific assessments with locally-meaningful assessments where appropriate, and use such assessments to inform and stimulate scientific inquiry (i.e. the reverse of science prioritising areas for participatory inquiry).

Some unanswered questions.

Recognition of the validity of different stakeholders' values is challenging because it implies trade-offs and, potentially, redistribution of power. Culture, knowledge and power issues imply more complexity than scientists are used to, and cause anxiety for institutions who want set methods and procedures to follow. As noted above, experience is stronger at the local level, so we are still some way from developing models to link local and scientific assessments - but we do now have the basic experience, from many countries, to make initial attempts which can be validated within specific institutional contexts.
One clear benefit of PAMEB is that the *process* of revealing perceptions, analysing results and making decisions can contribute to local people's empowerment, clarify rights, and strengthen resource management decisions. But for such an outcome to be valued, national priorities would need to shift from top-down planning towards local conservation efforts. Currently these processes, and the 'messy' results, are not always convincing to national decision makers, who expect mechanisms to aggregate quantitative spatially-comparable data on the local scale to provide information at the national scale. Effort must be focused on the complementary value, and greater relevance, of qualitative and location-specific information.
However, given concerns about intellectual property rights, access to genetic resources and benefit sharing (CBD 2002; Laird 2002), methods which do not require *exchange* or *extraction* of information but instead help people to make decisions based on their own information gathering, may be preferable. This would also help to overcome the intensive time and skill demands of approaches which

attempt to make *explicit* the knowledge systems of different stakeholders (Sinclair and Walker 1999), in favour of more pragmatic and constructivist approaches which focus on creating a dynamic knowledge interface (Blaikie et al. 1997) of creative value to all participants.

Conclusions

Resource assessment is the most advanced field of participatory endeavour in forestry (see e.g. Carter 1996), but the challenges of PAMEB are more complex because:

- biodiversity as a whole is unmeasurable, and probably unknowable; and its assessment requires the inclusion of religious, cultural, emotional and aesthetic values which are difficult to quantify and compare among stakeholders;
- linked to this, an increasingly sophisticated appreciation of indigenous knowledge systems requires an approach which goes beyond simple enumeration and statistical analysis;
- the unprecedented information demands at a large scale (regional, national, international) bring new sets of stakeholders into juxtaposition, and produce patchy and heterogeneous data sets.

The internet workshop showed that in cases from Laos to Cameroon, from Canada to Scotland, PAMEB provides scope for improved resource management through empowerment and provision of relevant valid information - at the local level, and in some cases at a wider level. But high expectations cannot always be met, particularly where the value of local people's time and knowledge is overlooked. PAMEB can have greater impact than traditional assessment approaches, because local decisions about resource management are made more quickly, when local people are involved in the assessment (Danielsen et al. 2000), and collaboration in PAMEB can enhance trust and communication between local people and officials (Rijsoort and Jinfeng 2002), but it has not been clearly demonstrated that data at regional scales is available more quickly or cheaply.
In fact, it seems that the *process* of negotiating, observing and analysing indicators may bring about more change than the data gathered itself, and in particular can enhance benefit-sharing, as well as be more sustainable than externally led processes. If biodiversity management is to be inclusive, and to benefit from the commitment, knowledge and values of local stakeholders, it may be that *national* monitoring, assessment and reporting processes need to adapt to the reality of *location-specific* values, by adopting mechanisms to accept and integrate qualitative, spatially-diverse information relevant to the differentiated needs of the people living within those national boundaries. Instead of asking whether local assessments fit national needs, we can turn the question around and ask what is interesting for national policy people, in what has been done locally. The production and advocacy of local information, which is demonstrated to be valid, reliable and useful, may do more to demolish the spectre of vast insatiable data needs (for national monitoring and reporting) than a top down approach which seeks to apply a uniform data collection approach.

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