

Experts on the field of forest biodiversity

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Abstract

Forest biodiversity is defined, theorised and studied in and by the natural sciences. Now social sciences are encroaching on the same field. Social and natural sciences (among others) are co-operating in the forest discourse. New methods, theories, definitions, norms and actors have evolved in the field of forest biodiversity.

The focus in this study is on the following questions: 1. How do social sciences define, theorise and study forest biodiversity as opposed to natural sciences? 2. What is the role of social scientists in the field? 3. How do these two disciplines co-operate? and 4. What is the social dimension of forest biodiversity?

I have based my study on qualitative semistructured interviews. I have interviewed social and natural scientists and also other actors in the field of forest management in Finland (forest industry, authorities, non-governmental groups).

The data has been analysed by using actor network theory and constructivism as a method. However, the principal and most descriptive concept for analysing the data is constructed on the concept of *agora*. Agora is a social place where, for example, knowledge transformation takes place. Moreover, it is a public space where different actors meet.

Preliminary results indicate that the social dimensions of biodiversity are not explicitly defined, and the content is unclear to the interviewees. There are disciplinary (epistemological) differences, but intradisciplinary differences are also notable (e.g. definitions of nature conservation). Co-operation is considered important (e.g. certification), yet the (explicit) natural sciences dominate the (sometimes implicit) social sciences in the discourse.

It seems that more discussions and studies are needed to transform or even define the content of forest biodiversity and its social dimension. Forest discussions need to be open to new dynamics, and transdisciplinarity may be one answer.

Keywords: Forest biodiversity, interdisciplinarity, expert knowledge, constructivism

Introduction

If we wish to understand how ecosystems can be damaged or repaired by humans, we must first fully comprehend the interrelations between ecosystems as ecosystems and their interrelations with society (O'Riordan, 2003, 7)

According to Convention on Biological Diversity (1992), biodiversity can be considered on three levels: genetic diversity, organisational diversity and ecological diversity (see also e.g.) Harper and Hawkesworth (1995). Chapin *et al.* and (2000, 239; Haapala & Oksanen, 2000) comment that biodiversity and its links to ecosystem properties have cultural, intellectual, aesthetic and spiritual values that are important to society. "Biodiversity is a tool for a zealous defence of a particular social construction of nature that recognizes, analyses and rues this furious destruction of life on Earth. Biologists aim to change science, conservation, cultural habits, human values, our ideas about nature, and, ultimately, nature itself". (Takacs, 1996, 1-2). Biodiversity is also a political tool that is strongly context- dependent on time, place and social conditions, aims and needs.

The conservation of biodiversity has received very little attention in the social sciences. This may be partially due to the technical orientation in the natural sciences, such as the elaboration of taxonomies (Baker, 2003, 23-24). Natural sciences are used to define, theorise and study forest biodiversity without interference from the social sciences. Now social sciences and knowledge are encroaching on the same field. Social and natural sciences (and other sciences as well) are co-operating in the forest discourse. New methods, theories, definitions, norms, and actors are emerging all the time. To communicate and understand the differences between the actors is a reasonable starting point for good multisectoral or interdisciplinary co-operation.

Natural scientists study, test and construct models, which are usually based on testing a hypothesis, and in which certain methods lead to results. Social sciences are more interested in the research process as such, rather than the end result. This is largely because research problems in social sciences cannot be reduced to a laboratory-like test setting, in which various factors can be observed, assessed and their effect anticipated. Although terms such as reliability, validity and relevance are used when examining the knowledge produced by natural sciences, the results nonetheless are products of research settings and methods constructed by people. Whether this all has anything to do with reality is a relevant question, as it might be that some completely unknown factor has influenced the research result – even if the research is based on tests. I shall attempt to illustrate that natural sciences are neither more advanced nor more backward than social sciences in terms of the subject of the study or how much or for how long the subjects has been studied. Ultimately, both sciences are human-oriented and reflexive. Nor are the research topics of social and natural sciences quite as distinct as described above. For instance, urban ecology is very close to social sciences, while environmental policy is, to

a certain extent, close to natural sciences. Any attempt to draw a line between these research areas is pointless, so fluid is the line.

In Luhmann's (1989) description, society is made up of boundaries between different systems caused by communication, or perhaps by the lack of it. By the same token, the relationship between sciences could be described in the same way. Society and the environment are increasingly intertwined, and we might imagine this to mean that the ecological and social dimensions are both considered when assessing the recreational value of mushroom picking forests or breeding grounds of flying squirrels. The traditional division into social and natural sciences may become completely irrelevant in future when studying such problems as the examples above. That is not to say that basic research in both areas would be unnecessary, and it will undoubtedly be conducted also in future. However, it is a different question whether a third, new science, combining natural and social sciences is emerging, or, indeed, has already emerged. Are we already making a transition to problem-based expertise and does that call for a transdisciplinary environmental agora? Sociology has discovered the environment 'outside' society in addition to that which is 'inside' (cf. Luhmann 1989) and is now talking about a whole in which the environment is seen as something else besides an opposite to society.

Are social sciences needed in solving forest biodiversity issues and what is their role? In addition to purely natural or social sciences, we might consider the concept of hybrid knowledge, by which I mean the combining of social and natural sciences. In order to be able to solve complex problems involving individuals, communities and societies, as well as populations and ecosystems, and thereby the welfare of the entire planet, one possibility that should be considered is the combination of different sciences (see Massa 1998, 280). At the very least, interdisciplinarity, perhaps even transdisciplinarity, could be introduced to solve environmental problems (see Thompson Klein, 1990).

Social sciences participate in the forest discourse by bringing the social dimension into natural scientific research. Indeed, social scientists have adopted new, increasingly popular concepts concerning the environmental problems of society in their efforts to chart environmental problems at the local, regional and global level. Some of the concepts come from natural sciences, but others are redefined from a social scientific perspective. Social sciences have, thus, employed open communication in generating concepts for themselves that are derived from the concepts of other sciences (cf. Giegel, 1993). This is evident in concepts introduced to social scientific research, such as biodiversity and ecology, the content of which has evolved within the debate in social and natural sciences. Natural sciences, in turn, refine the concepts to encompass a wider scope or define their contents in more detail in order, for instance, to harmonise national and international definitions. Can the refining of concepts become collaboration between different sciences, or is it already happening? What to do about scientific paradoxes, such as 'sustainable development', which mean different things to different

users? Or does it finally matter if the concepts are constructed differently – it is only natural that contents develop along with processes.

Nowotny *et al.* (2000) write about weak and strong contextualisation. An example of weak contextualisation in natural sciences is physics, where the author, time or place do not have the same relevance as in strongly contextualised social sciences, sociological interview studies being an example. Unlike sciences of weak contextualisation, social sciences can reflect on and react to signals. However, it should be borne in mind that all research is contextualised (Nowotny *et al.* 2000, 121), but the significance of the context is a different question. I am particularly interested in the context-sensitivity of my two topics. What happens when I ask different people to construct their idea of forest biodiversity or nature? What is the significance of the context in that situation? Biodiversity is originally a construct of natural sciences, and we might therefore assume that it has features of weak contextualisation, whereas the conceptualisation of nature is not particularly bound to natural sciences. It can equally well be defined from a philosophical perspective, for instance. In discussing the context issue, I will bear in mind the environmental agora, or how context affects communication.

In recent years, the biological diversity of forests has been one of the key concepts in the Finnish debate on forest management. The concept of biodiversity allows us to study how experts adopt and construct concepts, and which biodiversity values and meanings emerge as the most important for different groups. Biodiversity is a suitable concept, because it is natural on the one hand, but political and social on the other (Gaston 1996, 3–6). Biological diversity has ecological, economic, as well as sociocultural, value.

From a societal point of view, forests have been economically, politically, socially and culturally significant in Finland. Indeed, Finland has been aptly called a forest sector society. Forests are a source of conflict (Hellström, 2000), the cradle of national culture and a cornerstone of economic and social welfare (Karppinen, 2000, Ovaskainen, 2000).

The Finnish forest debate also reflects the widespread need for a perception of expertise and need for participation. The role of scientific knowledge in the diversity discourse in Finland has only been part of the debate. We may say that the diversity debate rages on in an environmental agora, supported by different networks and threads, with different people in different roles, and with expertise varying from weak to strong contextualisation. The content, reliability, purpose and usefulness of information are subject to debate. Expertise is disputed over based on content (ecological and its internal debate, economic and its internal debate, social and its internal debate, and debate between all of these) and institutional grounds on the one hand, methodological arguments, political grounds and the justification of subjective experience on the other. Thus, expertise is an issue that involves at least knowledge, institution, method, politics and emotions. These are the pieces or threads that combine in each expert within some framework and then create networks in the environment agora.

1. knowledge expertise in forest biodiversity issues
2. institutional expertise – control, means

3. political expertise
4. methodological expertise
5. emotional expertise
6. networking expertise – creating links
7. thread expertise – creating links
8. timeline expertise: anticipation, state of art, monitoring
9. problem-based expertise

Social network linkages between participants differ vertically (bridging ties)¹ and horizontally (bonding ties)² (Wolf, 2002). Such interaction can also be termed an agora, a market place, where different participants or actors come together in one place at the same time to meet, interact, communicate and exchange knowledge.³ Every interaction and interactor has a context and a background. It is the context from which the constructions of knowledge emerge. Knowledge exchange at the market place is socially constructed and dependent on time, space and the actors' roles. Knowledge is not just a product of technology or the intellect, but also a process of special contexts of products (Knorr Cetina, 1999, 17). The context itself may be open or closed⁴ (Giegel, 1999, Saaristo, 2000). Each of us has many expertises⁵ depending on the context (see Saaristo, 2000).

The links between ecologically and socially sustainable innovations are weak. A sociologist would rather discuss matters with other sociologists, and an ecologist prefers to talk to another ecologist to solve a problem (see Julkunen 2003). Thus, in the everyday decision-making procedures around forest issues, those elements are easily neglected that require competence of a discipline that is far from one's own. Legitimation seems to require concrete, explicit norms, indicators, and check lists. But how can different social groups be taken validly into account in different contexts? What is the role of social sciences – mediator or interpreter?

¹Individuals or associations contribute information to support natural resource management or decision making occurring at higher levels of social organisation and broader geographical scale. In addition it integrates local community perspectives into a centralised decision-making process. (Wolf, 2002).

²Participation includes horizontal interactions among individuals and groups within communities. These interactions support the accommodation of competing claims for a localised resource. (Wolf, 2002).

³*Agora* is a development of an intimate, interactive and anticipatory awareness. The *agora* embraces more than a market or politics. It is a public space, which invites exchanges of all kinds and creates a context where wishes, desires, preferences, demands and needs can be articulated. (Nowotny *et al*, 2001, 209).

⁴According to Giegel (1993,108), an open context seeks to transcend tight disciplinary boundaries between science or build bridges in between. It anticipates communication between the systems, which may lead to scantier knowledge of the inner system of itself. A closed context, on the other hand, tends to be research of an inner system itself, with no connections to systems outside. It is akin to laboratory research in that the external context is of no consequence to the research itself. According to Giegel, social sciences tend to have an open context, while that of natural sciences is closed. However, the matter is more complex than that (see. Kohl, 2003). We might say that there are social scientific closures as well natural scientific ones: outside their own discipline scientists are only regarded from a pragmatic perspective as external experts (see Kohl, 2003, Saaristo, 2000).

More substantially and concretely, the focus of my research is on the following issues: (1) How to develop ways to integrate social-scientific and ecological approaches into social sustainability (in forest discussions), and to establish a theoretical and conceptual framework for such development. In particular, to acquire a role for the social sector and to ascertain why the environment is not considered one of the duties of the social sector, and what the future will be like, if no sector takes responsibility for the content, values and development of social sustainability, such as amenities, health or welfare; (2) How to form a platform for examining how different experts and the knowledge of different representatives can guide sustainable policy.

In the segregated scientific community, scientists usually study either ecological or social systems, yet the need for an interdisciplinary approach to the problems of environmental management is becoming increasingly obvious. The overall objective of my research is to develop tools for improving communication between different actors and sectors. Moreover, the idea and criteria for social sustainability in forest discussions have been researched.

Data and methods

The study is based on qualitative semistructured interviews. I have interviewed social and natural scientists and also various other actors in the forest sector in Finland (forest industry, authorities, and non-governmental groups). Altogether 16 experts were interviewed for about 2 hours each. In this paper, I shall present only one part of the extended study. I will give some examples of the interviews to show some aspects of the constructions of biodiversity. It is important that these interviews and results be not generalised to apply to larger institutions or different contexts. The aim of the study is more than merely to reveal institutional differences. It is to show the different roles the interviewees assume in different contexts, and the significance of these roles and contexts (being a researcher, natural scientist, mother, politician) to the constructions of biodiversity (answers to the questions during the interview) and thereby to the possibility of communication and interdisciplinary co-operation.

The data was analysed by using discourse analysis, constructivism as a method, as well as the rhetoric of different experts. The principal and most descriptive concept used for analysing the data in this paper is built upon the weak and strong contextualisation theory of Nowotny *et al.* (2000). I use the term *agora* (market place). It is a social space where knowledge is transformed, for example. Moreover, it is a public space where different actors meet.

⁵ Who is an expert depends on the context. It is about knowledge, confidence, responsibility, interaction and values and of social capital. (Saaristo, 2000, Knorr Cetina, 1999)

Moreover, I use the results of a book about social impact assessment that I co-edited and which has just been published in Finland. The book contains best practices, definitions for social impact assessment and new methods to assess social dimensions in various procedures (e.g. urban planning). I wrote two of the articles in the book and here I have taken some ideas from the articles to the discussion of what is social, and what are social changes in this context.

Social dimensions on the forest biodiversity

The social dimensions of the National Forest Programmes in Finland are limited to assessing the impacts of forest management on employment and various aspects of rural development. But employment is not the only aspect to the social dimension. In the following table, I have gathered ideas of the social dimensions that could be checked case by case in national or international forest planning or assessment procedures.

Social ?
• us – different kinds of people and their needs and aims
• also a process: communication is a social habit
•welfare, health and amenity – or having, loving and being
• there is no social without economic and ecological connections

Social dimensions could be construed to refer to almost anything. However, the main point is to understand the context in which the social dimensions are evaluated, analysed and the knowledge used. Method does matter! Because there are many parallels to another research area of mine (social impact assessment), I will next use a table (Sairinen & Kohl, 2004) to elaborate the social dimensions and thereby explain the need for social science in the field of forest biodiversity.

Social impact means change in
• people's lifestyle (how they live, work and interact)
• their culture (shared beliefs, customs, values, language and dialect)
• their community (its coherence, stability, characteristics, services and circumstances)
• their political system (opportunities for people to participate in making decisions concerning them, the degree of ongoing democratisation and resources associated with them)
• their environment (availability and quality of food, risk level; physical security; use and control of natural resources, quality of air and water)
• their health and wellbeing
• their personal and property rights
• their fears and wishes (ideas about security and the future of the community)

Social impact assessment can be seen as a research method, but it is also a paradigm or an instrument of control (Vanclay, 2003, Kohl & Sairinen, 2004)

Social processes, social impact assessment or even social sciences cannot be defined or categorised in any particular way by using a set of indicators or factors. Social sciences are more interested in the social process itself than its results. Different methods yield different answers – most social factors are very much context dependent: who says what and where. Contrast this to physics, for example, where the social context does not change the results. This should not be taken as an evaluation, merely a statement of the fact that social and natural sciences operate, theorise and analyse knowledge in different ways. That in itself, however, is uninteresting; what is interesting is how to integrate, understand and use knowledge produced by different sciences. And in this particular case, how and why social sciences should be integrated into the forest biodiversity discourse.

Social sciences have many innovative methods to study social dimensions. I have tabulated below the ways to use some methods of social sciences to gather social knowledge (see Callon, 1999, Kohl & Sairinen, 2004)

Model	Participation	Characteristics	Practice
A) Training the participants	<i>etic</i> , or participant as object	external, no contact, general information, no case-sensitive context	information on forest owners is collected (by a consultant)
B) Hearing the participants	<i>emic</i> , or participant as subject	internal, hearing, direct interaction, case-sensitive context: what is heard, is interpreted	forest owners are interviewed (by a consultant)
C) Representing the participants	<i>etic</i>	external, interpreter, otherness, case-sensitive context: interpretation of information, which is passed on for hearing	forest owners represented by someone (forest owners' association) in a hearing or interview
D) Collaboration in generating knowledge	<i>emic</i>	internal, process information, no general information context, continuous reconstruction of knowledge, interactive knowledge building	forest owners participate in the whole process

The table incorporates the ways of obtaining information, prerequisites for collecting information, the context and what the different positions mean in practice. It makes use of the concepts of *emic* and *etic* developed by Rappaport (1979) to describe the type of participation. The *emic* perspective describes people's own understanding (subjectivity) of the information and ideas about their environment. The participant is the subject in knowledge generation. The *etic* perspective, on the other hand, observes people's actions in their

environment from the outside and as objectively as possible. The models are not mutually exclusive, that is, a person can have both *emic* and *etic* knowledge (a forest owner can be a researcher).

The purpose of the table is, first of all, to show that the four models complement each other and are not to be used alone. Local knowledge gleaned from literature (newspapers, the media analysis) is a good starting point, as are statistics of a certain area, yet integrating good structured thematic qualitative interviews or participatory events surely provides new dimensions, creates discussions and conflict situations that influence plans, decisions or assessments made on the basis of sustainability.

Biodiversity as a construction

The results of the study show that the social dimensions of biodiversity are neither explicitly defined nor is the content of the idea clear to the interviewees. There are disciplinary (epistemological) differences, but intradisciplinary differences are also notable (e.g. definitions of nature conservation). Co-operation is perceived as important, but in the discourse (explicit) natural sciences dominate over (sometimes implicit) social sciences.

jk: What's your view on how social sciences operate in the forest sector and in forest issues...

Natural scientist: Well, frankly, I know damn little and really the only place where I've met with these issues was in the Fibre steering group and other seminars, where they were discussed. So I just, because I know just about nothing, I won't say anything.

jk: What do you think it requires of a social scientist, this collaboration with natural scientists?

Natural scientist: I'd guess more in the direction that, because I think the world is simply different for social scientists and natural scientists, natural sciences at least pretend to be some kind of an exact science. Whereas social science, I think, is more qualitative, vague..., well, not really vague, but still based on opinions, interviews, such things. I suppose collecting numerical data can be a lot more difficult in social sciences.

Weak and strong contextuality: the division is made above according to the exactness of a discipline. It is clear that the interviewer provided the cue to look for a dichotomy. The interviewee, in turn, defined the dichotomy. Although criticism has been put forward against giving such instructions for a dichotomy, the fact remains that the division of universities into faculties has not been abolished although a multidisciplinary approach is occasionally certain to call into question the division by subject.

Nature is in standard language, which refers to everything, that is, it actually refers to biodiversity, but it is used in different contexts. Humans are part of nature... When you talk about biodiversity, somehow you talk about something that is outside humans. (Social scientist)

Biodiversity is most of all diversity of species and genetic diversity, but on the other hand, some people think that the diversity of structures is also part of biodiversity, the diversity of ecosystems is part of biodiversity and even the range of forest functions is part of biodiversity and so on. If we now take a wide perspective, then nearly everything... everything belongs to it, then it makes sense to define the issue this way. Personally I'm used to using the term biodiversity when we're talking about the diversity of species. It's of course true that it loses its meaning if it includes everything possible, its innovation value decreases, but, on the other hand, it is more important to understand what we're talking about and attempt to find out scientifically what it is in each case. (Natural scientist)

It's not technology, it's real life. Everything that moves on its own. Every five years some fancy new name has to be invented for the same old thing. (NGO)

The aim of nature conservation, nature conservation and biodiversity are different concepts. Nature conservation is this political movement, or this mission, which I also represent here, and biodiversity then is a pure concept. (ENGO)

weak context biodiversity	'middle-of-the-road' context	strong context biodiversity
1.gene 2.species 3.ecosystem 4.structure 5.function	ecosocial new paradigm agora transaction zone branch of science intertwined function and structure of process	sociocultural construct, concept model, value, a tool for control defined politically changes dynamically
A.Expertise: closed, narrow and hard ecological core	expertise: open transdisciplinary hybrid	expertise: open quadruple helix: science – industry – NGO – administration – (inclusions)

On the basis of these narrow discussions it comes visible? that there are differences in constructing what is biodiversity, what is nature and what is their relationship. I will begin the discussion with the context. It is clear that some of the interviewees (mainly natural scientists) began to discuss biodiversity through structure and function. Biodiversity is organised like a textbook division: diversity of species and genes, diversity of structure, diversity of the ecosystem. Some wonder whether the functions of a forest should be included in diversity.

Discussion

It seems that more discussions and studies are needed to transform and even define the content of forest biodiversity and its social dimension. Openness for new dynamics in forest discourse is needed – transdisciplinarity may be an answer.

Social dimension on forest biodiversity permeates ecological and economic dimensions – and the other way around. Therefore, in my study I suggest that problem-based studies of different dimensions should be

conducted. Too often different dimensions on forest biodiversity are studied and analysed separately – if studied at all (social dimension). In a forest context, when talking about the sustainable use of forests, the recreational use of forests, for instance, could be examined. Under this heading, the aim is to identify, evaluate, analyse and use information that requires expertise in social, economic and ecological aspects. That is, the social, ecological and economic impact of the use of forests are not assessed separately, but a group of experts makes a problem- or theme-specific vertical analysis.

Means:

1. social, economic and ecological expertise: methods, data collection and analysis. Method does matter!
2. dialogue between different actors networking without institutional limits provides new innovations
3. the idea that each actor is an expert (bottom-up)
4. innovations from the perspective of forest actors
5. understanding everyday life
6. operational principles are not 'either-or', but 'both-and'
7. soft values and quiet groups alongside technological-economic norms and indicators
8. identifying weak signals and examining them
9. farsightedness, answering future challenges (an increasing number of women forest owners etc.)

The results show that interviewees basically define biodiversity by using weak or strong context based perceptions, but it is not a given that the environmental sector would be classified as belonging to the weak context, nor the social sector to the strong. Moreover, it is interesting that, although NGOs define biodiversity differently, their basic understanding is the same: it is a construction, a political definition. All NGOs confer social, ecological and economic aspects on biodiversity. This is indicating that at least these NGOs are, in these issues, not so far away from each other as the media and even these NGOs themselves believe.

Common to all interviews is the perceived importance of, and need for, social science. Social scientific knowledge and methods are needed, and also interdisciplinary studies, where social and natural scientists would co-operate in practice. Without practice, communication is problematic, even unnecessary. Those in favour of better co-operation participated in multisectoral projects. Their experience was that, after co-operating for a while, people get to know each other better, and discussions become more constructive, open and innovative. By contrast, when people do not know each other, they tend to keep to their positions and it is more like a trade-off situation.

What is needed is a definition and content for the social dimension of forest biodiversity. Social scientists are missing. The social sector is missing and should be integrated better in forest planning. There are now opportunities. It is time to link the social sector and the forest sector into a whole.

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