Managing Forest Ecosystems

Peter Spathelf
Editor

Sustainable Forest Management in a Changing World: a European Perspective

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Sustainable Forest Management in a Changing World

Managing Forest Ecosystems

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Aims & Scope:

Well-managed forests and woodlands are a renewable resource, producing essential raw material with minimum waste and energy use. Rich in habitat and species diversity, forests may contribute to increased ecosystem stability. They can absorb the effects of unwanted deposition and other disturbances and protect neighbouring ecosystems by maintaining stable nutrient and energy cycles and by preventing soil degradation and erosion. They provide much-needed recreation and their continued existence contributes to stabilizing rural communities.

Forests are managed for timber production and species, habitat and process conservation. A subtle shift from *multiple-use management to ecosystems management* is being observed and the new ecological perspective of *multi-functional forest management* is based on the principles of ecosystem diversity, stability and elasticity, and the dynamic equilibrium of primary and secondary production.

Making full use of new technology is one of the challenges facing forest management today. Resource information must be obtained with a limited budget. This requires better timing of resource assessment activities and improved use of multiple data sources. Sound ecosystems management, like any other management activity, relies on effective forecasting and operational control.

The aim of the book series ***Managing Forest Ecosystems*** is to present state-of-the-art research results relating to the practice of forest management. Contributions are solicited from prominent authors. Each reference book, monograph or proceedings volume will be focused to deal with a specific context. Typical issues of the series are: resource assessment techniques, evaluating sustainability for even-aged and uneven-aged forests, multi-objective management, predicting forest development, optimizing forest management, biodiversity management and monitoring, risk assessment and economic analysis.

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A European Perspective

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Preface

Yet another book on the topic of 'Sustainable Forest Management' can only be justified by new information that is of direct relevance. The contents of this volume concentrate on the very latest factors and developments, thus, hopefully, contributing both to the book's attractiveness and to closing gaps in the discipline's database.

This book is written for researchers in the field of forest management, international forestry, and climate change-related issues, legal and policy advisors, as well as for managers of private companies who deal with SFM. The authors of the various sections are scientists in the field of forestry and other environmental sciences. They represent different institutions, mainly universities and research agencies in Germany, but also high-level international institutions in development co-operation, such as the World Bank, FAO, and IIASA.

The scope of the book is to refresh the meanings and perceptions of SFM against the background of the rapid changes in our natural and social environment. Climate change and the rapid increase of atmospheric CO_2 concentration is a global process with negative impacts of different kinds, among others on natural ecosystems such as forests. A crucial issue therefore is how forest management can contribute to forest conservation in light of changing climatic conditions. Moreover, policy changes such as the introduction of certification schemes and the new emphasis laid on Non-Wood Forest Products justify the re-evaluation of the role of SFM in delivering ecological goods and services from our forests. New technical approaches in forest management, like the application of ecologically sound harvesting techniques, are reviewed, as are genetic resources and their contribution to the adaptability of forests. Finally, the challenges of sustainability and global change are discussed as to whether they can be jointly tackled by the involved stakeholders.

The focus of the book reflects European priorities, i.e. the sustainable provision of goods and services in forests and an integrative land-use management as the core of the type of SFM to be adapted to upcoming requirements. Nevertheless, not only temperate forests but also tropical forests and their management are relevant issues in the realm of climate protection, biodiversity conservation, and the provision of multiple goods and services.

The book comprises 14 contributions covering the whole range of SFM as the core contributions of forests to sustainable development: The first contains an introduction with ethical considerations on sustainability, reflections on the

'career' of the concept, and some thoughts on Global Ethics of the Environment (Hartmut Ihne and Peter Spathelf).

In the second chapter Gerhard Dieterle, Chief Forest Advisor at the World Bank, Washington, DC (USA) outlines the institution's strategy and operational guidelines for the promotion of SFM with key issues such as forest governance, cross-sectoral impacts, and forest-sector finance and their outcomes for poverty reduction and economic development.

The third chapter deals with the conservation of tropical forests and climate change mitigation. Its authors are Pierre Ibisch, University of Applied Sciences Eberswalde and Lars Schmidt of the German Institute for Development Co-operation. A special emphasis is laid on new strategies for tropical forest conservation in the face of the post-2012 climate regime, such as deforestation avoidance.

In the fourth chapter, the European pathway to SFM is drawn in view of special consideration of the process to establish and refine criteria and indicators for SFM in Central Europe. The authors are Michael Köhl, from the German Federal von Thünen Institute (Federal Research Institute for Rural Areas, Forestry, and Fisheries), Hamburg and Ewald Rametsteiner from University of Natural Resources and Applied Life Sciences in Vienna and the International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria).

In a further chapter, Leif Nutto, Ulrich Schroeder (both from the University of Freiburg) and Peter Spathelf (University of Applied Sciences Eberswalde) describe obstacles to SFM and perspectives of SFM in tropical forests in South America. After reflection on deforestation and its main drivers, the prerequisites of SFM are discussed. A successful silvicultural system for SFM in the tropics is presented. The contribution closes with a comparative case study on RIL in the Western Amazon.

Wulf Killmann, Head of the Forest Products Division at the FAO (Italy) analyses the global patterns and trends in NWFP development and the role of NWFP to promote SFM (Chapter 6).

The maintenance of long-term adaptability of forests through the conservation of genetic diversity is emphasised by Ralf Kätzel from the Brandenburg Forest Research Station (LFE) at Eberswalde. In his contribution (Chapter 7), he stresses measures to protect the genetic sustainability of forest management, particularly with regard to climate change.

In Chapter 8, Andreas Bolte and his co-authors focus on the decisive role of silviculture in adapting forests to climate change. Different options are described, such as tree species selection, thinning, as well as regeneration and felling. Following a more active adaptation strategy, it is shown that the resilience of forests in central Europe can likely be increased in the face of global change.

In Chapter 9, Thomas Knoke from Munich Technical University reflects on silviculture's low relevance in management and how to sharpen its profile, given the fact that silviculture integrates economic, ecological, and sustainability-assurance components.

Martin Welp, University of Applied Sciences Eberswalde, focuses on the role of science-based stakeholder dialogues in the framework of climate change and

possible pathways to sustainability (Chapter 10). Moreover, the current and potential shortcomings of stakeholder dialogues at the interface between climate policy and forest policy are discussed.

In Chapter 11, Monika Bertzky and Bastian Bomhard provide new insights into the complexity of the task of protected area management due to changes in conservation paradigms, the challenging nature of conservation targets, and climate changes.

In Chapter 12, Jürgen Pretzsch from the Dresden University of Technology gives a synthesis of different systems of tropical forest management. After a historical review on the institutional development and increasing diversification of forest organisations in the tropics, the strengths and weaknesses of the different systems are analysed economically and under the scope of to which degree they contribute to developing sustainable livelihoods and reducing poverty.

In Chapter 13, Ulrich Schraml and Roderich von Detten, after reflecting on the ambiguous meaning of sustainability and its relevance for forestry today, present the results of an empirical study with strategies on how forest enterprises and forest policy can deal with and prepare for future forest use.

In the final chapter, some conclusions on the perspective of SFM are drawn by Peter Spathelf.

Most of the contributors were invited speakers at a lecture series held at Eberswalde University of Applied Sciences in fall and winter 2007–2008.

Peter Spathelf

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Berlin, October 30, 2009 Peter Spathelf

Contents

Chapter 1
Introduction: Some Basic Remarks on Sustainable Forest Management, Environment and Global Ethics

Hartmut Ihne and Peter Spathelf

1. Conceptions and implementation of SFM are based on different theoretical approaches of 'conservation'. They imply various dimensions of development and a broad range of interests, perspectives, values, and philosophies of the individuals and collectives affected and involved (political, religious, economic, social, theoretical, etc.). Globalisation and global change makes this already complex relationship even more intricate. Down-to-earth approaches to SFM primarily have to describe their underlying theoretical assumptions, ethical values, and operational and political goals. Otherwise, they run the risk of being sound in theory but not applicable in practise.

In the public and academic discourse on conservation until today, conservation is very often 'identified with the preservation of natural resources' (Ehrenfeld 1978). Ehrenfeld distinguishes between 'resources' and 'non-resources'. 'Resources' in this sense have an appreciable monetary value to people (directly and indirectly as reserves of commodities). These (economic) resources are at the focus of the public debate. 'Non-resources' do not seem to be of that interest to societies. They only appear to have a potential value to people that cannot really be estimated – and that is the door to its vulnerability as well as to exaggerations and distortions.

The discussion of biodiversity in the last 15 years, however, has tried to overcome this ignorance of non-resources. The main argument is that regarding an inherent economic value of non-resources. In his critical book 'On the Arrogance of Humanism' from 1978, Ehrenfeld categorized nine hidden types of values of non-resources in an anthropocentric perspective:

1. Recreational and aesthetic values
2. Undiscovered or undeveloped values
3. Ecosystem stabilisation values

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4. Values as examples of survival
5. Environmental baseline and monitoring values
6. Scientific research values
7. Teaching values
8. Habitat reconstruction values
9. Conservative values (avoidance of irreversible change)

The problem of an argumentation type based on preconditions like this is that a loss of biodiversity might have dreadful consequences, but what they could be and where and when they might occur are unknown. If everything were viewed as a resource with potential implications for our environment, the foundation of our survival – the term 'resource' – would become empty.

Furthermore, we will probably never have sufficient knowledge of all the interlinkages and interdependencies in our biosphere (and sociosphere), and this ultimately leads us into a dilemma. How shall we – as individuals, societies, or politicians – when we talk about new preservation laws, decide how much to invest in forest management, etc.? Shall we assume that only nature has a value for mankind, or shall we assume that there is an intrinsic value (e.g. implicitly expressed in the diversity-stability hypothesis) (Gatzweiler 2004)?

To overcome the uncertainty generated by complexity, we need to develop an ethical framework that empowers us to draw ethically sound conclusions and recommendations for conservation strategies and action. This is the task of a statement of Global Environmental Ethics (GEE) that systematically reflects all dimensions and perspectives of environmental interventions (Norton 1987).

2. How can Global Environmental Ethics contribute to debates, policies, and politics of environmental protection, economic reform, the fight against poverty, etc., not only with regard to existing pragmatic and technical interests but also to their moral implications? How can an individual be persuaded to follow the demands of moral insight?

Even to answer these questions only briefly it is necessary to realise the source of the motivating forces of moral action. This can only be ascertained by accurately registering the various appropriate patterns of interests and pragmatic needs of local and global actors that exist and using them for the implementation of moral purposes. These include, for example, the call for an economic and ecological order that is capable of preserving sustainable development and world peace. This call is not only a demand that arises from humanitarian or moral motives, but is also anchored in the enlightened self-interest of industrialised and developing countries. Why not benefit – in the name of justice – from the fact that the willingness to accept moral self-obligations to comply with environmental and social standards increases in societies and companies, since on a long-term basis, moral actions is considered to have a conflict-easing, image-polishing, as well as a cost-cutting effect?

If the realisation of an alliance like, e.g. the Global Compact of the UN (which has inter alia a strong environmental approach) is not based on altruistic motives but on the idea of maximising economic benefits, this must not be the stumbling block from the point of view of GEE. Such a statement is only likely to be criticised, if it degenerates to a defence of the status quo as mere rhetorical declamation. From the

perspective of GEE, it is of no importance, whether an enterprise is willing to create an ecologically sound framework for economic activity due to rational self-interest and profit seeking, or due to genuinely moral intentions. GEE's only interest lies in concrete steps towards the realisation of an equitable economic order.

Consequently, GEE must not be afraid of using individuals' particular interests in ways that are in line with their opinions and – wherever necessary and possible – simply giving pragmatic and intelligent reasons in order to find obligatory institutional precautions for the peaceful, moral, and legitimate management of inevitable political, social, and ecological conflicts. Only by this means can GEE shield the 'law of reason' (Kant) from the reproach of 'impotence of obligation' and protect itself from the reproach of fabulously overstating its own importance. Thus, GEE does indeed accept the fact that sometimes an absolutely purposive-rational or egoistic motive lies behind an action, thus decreasing its moral value; however, in return, a reliable, credible empirical basis can be established and a sound basis of motivation for moral action created.

For this reason, the basic problems of applied GEE are not yet solved: The universal principles of human rights and civil liberty and justice do not indicate which concrete action should be taken in a certain situation (Attfield 1999).

It is indeed necessary to recognize the capacity for political and problem-solving rationality a priori in virtually everyone. In fact, though, it can actually be the greatest iniquity to attribute the same degree of political rationality to every human being and to pretend as if everyone were not only in principle, but also in fact capable of utilising credits/loans in a profit-oriented manner and achieving successful technology transfer.

The phenomenon of poverty manifests especially clearly that there is no absolute connection between the moral principle and universal material norms: Kant noted that poverty (and we can expand the argument to environmental vulnerability) only becomes problematic in a moral sense if it affects the individual's right of freedom. But when is this the case? From which perspective can this actually be judged – from the perspective of those suffering from environmental change and poverty, or from the perspective of practitioners (development workers, social workers, etc.), or from the perspective of science and the humanities?

Although GEE must permanently search for specific and appropriate strategies of implementation, in consistent reaction to given situations and thus realising the moral point of view by paying attention to cultural differences, GEE does not lead to factual cultural relativism. To cling to the concept of moral justice constitutes a binding norm for intercultural relations and does not exclude a factual variety of norms.

Taking any diversity of individual moral beliefs into account, GEE, however, demands that common grounds or what could be called overlapping consensus can be elaborated that accepts individual autonomy and integrity. Global Environmental Ethics, therefore, does not run counter to the principle of cultural self-determination, but rather defends the idea of cross-border cooperation on the basis of a minimum consensus and an awareness of justice across nations. This basis is regarded as adequately neutral to be compatible with a variety of ways of life and cultural characteristics; it hence constitutes an imperative moral approach of inclusion

[of the cultural diversity and voices itself in favour of] cultural levelling and a Eurocentric positivism of values.

The implementation of this kind of approach is only possible if applied GEE is based on the exact assessment and empirical analysis of the diverse determining factors of our concrete environment and cultural context in order to find on this basis the mediation of the general principle with cultural characteristics.

In the discipline of GEE, *productive interpretations of reality* in accordance with the idea of a 'law of reason' are requested; what is not needed, however, is a recourse to standard solutions that is blind to existing economic parameters and ideologies. GEE does not need to evoke the fiction of a world of homogeneous cultures, but rather refers to the real world of different cultures and their relationship to nature (Senghaas 2002).

Considering the implementation of GEE and the legally standardising function of reason, everything depends on the practice of the power of judgement, which is the ability to self-determine the individual forms of moral action in respective processes of assessment and analysis and to convert them into reality of the political and legal system, and the sustainable use of nature. This will not succeed, however, without detailed knowledge of the constellation of interests of different national and global actors, current economic processes, and political decision making – apart from the scientific knowledge of the biosphere. Equally indispensable is the continuous exchange with the respective scientific disciplines about how to make the moral and legal values operable, i.e. to adjust them to empirical situations without losing the core domain that first needs to be scrutinised.

3. How can the briefly outlined approach of GEE be reasonably arranged in the context of university education or political adult education? In this context, [exemplary] case studies and process-oriented forms of learning might offer a good opportunity to train the ability to distinguish between the level of principles and phenomena and between epistemology and action; it can also open the eyes for concrete ways of connection and mediation between both levels. Working in heterogeneous teams can also be useful to experience the extent to which not only cognitive-analytical but also communicative and social skills are necessary in the attempt to determine general and objective principles of acting. Field reports can sensitise to the basic problems with which Global Environmental Ethics is inevitably confronted when operationalising the concept of the law of reason. Last but not least, it is absolutely essential to clarify whether an ultimate justification of the understanding of terms such as personality, individuality, and integrity of human life is necessary before reasoning about rights and scopes and possible limitations.

Especially given the fact that empirical scientific disciplines shake the foundations of human self-conception, using self-attribution of personal identity and freedom, it must be shown to what extent the assessment of man is in itself justified and not negotiable. The idea of human rights – and consequently also their positive manifestation in the Universal Declaration of Human Rights – can thus be defended due to reasonable and comprehensible reasons.

4. Consequently forest (and development) policies and management approaches also face reproach because failing to state clearly that these policies and approaches

aim at granting categorical individual rights instead of being merely (acts of) charity is neither legitimate nor acceptable.

Environmental and development co-operation are not primarily a question of altruism and virtue ethics but rather a question of moral law and legal-moral standards in justice. Therefore, the fight against environmental change and poverty must be stripped of its aura of mercy; it must be pointed out that the eradication of absolute poverty and the achievement of a sustainable natural environment is to be achieved for the sake of the people suffering from it and also for an enlightened self-interest of both industrialised and developing countries (Habermas 1988).

Environmental and development policies have to fight their own marginalisation and not only for 'departmental interests'; otherwise they would turn themselves into a legal-moral conundrum: if states drown their efforts in the field of environmental and development policies in mere rhetoric, they will destroy their own legitimacy. Thus, it does not suffice to draw up a schedule to halve extreme poverty (e.g. "Shaping the 21st Century") and to recall the ecological challenges of climate change assertively from time to time (e.g. IPCC Reports), if – at the same time – it is not recognisable how economic, societal, and political structures will be changed.

However, this requirement cannot only rely on noble intentions and moral convictions of global and local actors; instead, it has to be an obligation that categorically demands compliance with legal-moral minimum standards that human beings owe each other.

If the policies of the UNEP, IPCC, the World Bank, and other transnational, international, and national institutions want to appear credible, the actors have to prove that they are aware of the distinction between obligations owed to a legal-moral perspective and standards requested by virtue ethics. Thus, from the perspective of GEE, it is not merely possible to find a basis of justification for forest and development policies. It is actually possible to develop an instrument of criticism of all tendencies to hide behind inflated demands and goals instead of implementing precise programmes to develop fair global ecological, economic, and societal structures. Doing so will enable the "target countries" – in particular the "least-developed countries" – to maintain their scope for self-responsibility and participation in global and local political and societal relationships. It is a fact that we need new concepts and instruments to answer the complexity of ecological challenges and its interwoveness with all dimensions of our lives.

5. Ethics of forest and forest management is or would be a derivation of GEE. It is a methodologically coherent and logically inductive-deductive conclusion of major moral principles on the one hand and of research-based empirical analysis on the other.

In Central Europe, a 250-year tradition of Sustainable Forest Management (SFM) has resulted in a tremendous variety of concepts and interpretations of the term. And in spite of the frequent use of the term, many questions concerning its criteria, functions, as well as practical application remain unanswered (Schanz 1996).

European forestry's first focus on maintaining a sustained yield of timber can be traced to the statement of the German mining administrator von Carlowitz (1713):

‘Forest resources should be used with caution to achieve continuity between increment and fellings’. The main intention of forestry and forest regulation was to protect forest area and productivity from the emerging wood-based industries.

Today, SFM is viewed as an ideal for managing forests worldwide. The great variety of opinions about SFM is primarily due to the different perceptions and interests of stakeholders. On the other hand, it is assumed that different views of how reality works also increase the variety of perceptions on SFM.

In order to avoid arbitrariness in the concept, SFM was acknowledged to have been shaped by the perceptions and convictions in all fields of an individual’s reality in the context of the ‘cultural theory’ (Thompson et al. 1990). As a consequence, there cannot be a single interpretation of SFM. However, in order to establish certain standards of forest management, it is necessary to understand which judgements or values concerning SFM are expressed. SFM as the result of a social bargaining process reveals that there is no right or wrong standard of SFM, but a more-or-less accepted one in the respective socioeconomic environment (Schanz 1996).

6. In 1992, the United Nations Conference on Environment and Development in Rio de Janeiro propagated a new paradigm of development, the ‘Sustainable Development’ (SD). The paradigm provides a direction for development approaches by emphasising that resources should be used in a way that does not limit the opportunities of future generations and are to be used efficiently and in such a way that revenues and costs or opportunities and risks are equitably divided among social groups (Burger 2005).

The purpose of the ‘Forest Principles’ as part of Agenda 21 was the conservation and management of forests and their multiple functions and uses. Subsequently, these principles have guided further regional processes such as the Ministerial Conference on the Protection of Forests in Europe (MCPFE) in Europe. SFM as defined by MCPFE has been recognised as a good example for implementation of the Convention on Biological Diversity (CBD) ecosystem approach, which can be seen as the strategy for the integrated management of land, water, and living resources that promotes conservation and sustainable use in an equitable way.

As many of the people affected by ecosystem management as possible should be able to participate in the pathway-searching process. There is consensus that SFM and the ecosystem approach show considerable overlap, such as multiple and sustainable use of resources, conservation of ecosystem functioning, and equitable benefit sharing. SFM therefore is forest management in the service of SD: since it is not possible to implement all principles simultaneously and fully, SFM is an ongoing process of search and improvement (Burger 2005).

The most recent evidence of the occurrence of significant climate change reported by the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report will probably affect forestry and forest management in an unprecedented way. It is thus expected that climate change will lead to increased biotic and abiotic disturbances, to changes in phenology, species distribution, and growth of forests in Europe. In this process, differences between Northern and Southern Europe are likely to occur.

There is no doubt that the development of adaptive forest management strategies in the face of climate change is a key challenge for future resource management in

Europe, and worldwide. Adaptive forest management is seen as a vital part in the overall strategy to preserve the potentials of sustainable resource utilisation and to avoid climate change becoming a global catastrophe (‘managing the unavoidable in order to avoid the unmanageable’, Bierbaum et al. 2007). SFM can therefore take a key role in a pro-active adaptation of structures and processes in present-day forestry. This planned adaptation (IPCC 2007) – in contrast to a more spontaneous or autonomous adaptation – does not primarily aim at preserving and developing forest composition and structures, but the functionality of forests under conditions of climate change as a prerequisite for fulfilling the future needs of forest ecosystem services.

So do we have to change the paradigm in (sustainable) forest management? When change, risk, and uncertainty have to be increasingly addressed in the face of global change, then a discipline that has traditionally focussed on local and regional conditions (e.g. the ‘iron law of the site’, postulated by Wilhelm Pfeil 1783–1859) either has to re-invigorate its fundaments or face becoming obsolete.

In the face of global change, it is questionable whether the main goal of forestry or forest management should be sustainability or even resilience with sustainability as a by-product (Puettmann et al. 2008). Ultimately, forests have been only one pillar of our existence in the past – albeit a major one – and this status will not change in the future.

References

Attfield R (1999) The ethics of the global environment. Edinburgh, pp 232

Bierbaum R, Holdren JP, MacCracken M, Moss RH, Raven PH, Schellnhuber HJ (2007) Confronting climate change: Avoiding the unmanageable and managing the unavoidable. SIGMA XI, Washington DC.

Burger D (2005) Requirements for sustainable forest management following the paradigm of sustainable development. In: Burger, Hess, Lang (eds) Forest certification: an innovative instrument in the service of sustainable development? Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Eschborn, pp 61–76

Carlowitz von HC (1713) Sylvicultura oeconomica, oder hausswirtliche Nachricht und Naturmässige Anweisung zur wilden Baum-Zucht.

Ehrenfeld D (1978) The arrogance of humanism. Oxford, New York, pp 286

Gatzweiler F (2004) The changing nature of economic value. Indigenous forest garden values in Kalimantatan, Aachen, Indonesia, pp 249

Habermas J (1988) Aus Katastrophen lernen? In: Jürgen Habermas: Die postnationale Konstellation. Politische Essays. Frankfurt am Main, pp 65–90

IPCC (2007) Climate Change 2007 – Synthesis Report. Summary for Policy Makers. http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf. Accessed March 2008

Norton BG (1987) Why preserve natural variety? Princeton (NY) Biodiv Ref QH75 .N67

Puettmann KJ, Messier CC, Coates KD (2008) Critique of silviculture: managing for complexity. Island Press, Washington, DC, p 188

Schanz H (1996) Sustainable forest management – on the meanings and functions of a central term in forestry. Voluntary Paper for XI. World Forest Congress, Antalya 1997

Senghaas D (2002) Kulturelle Globalisierung – ihre Kontexte, ihre Varianten. In: Bundeszentrale für politische Bildung (Hrsg.). Aus Politik und Zeitgeschichte B 12. 6–9

Thompson M, Ellis R, Wildavsky A (1990) Cultural theory. Boulder, SanFrancisco, Oxford, pp 1–18, 25–38

Chapter 2
Sustaining the World's Forests: Managing Competing Demands for a Vital Resource – The Role of the World Bank[1]

Gerhard Dieterle

Forests cover about 25–30% of the Earth's land surface, or between 3.3 billion and 3.9 billion hectares, depending on the definitions used. Each year, forests covering an area the size of Portugal (approximately 92,000 km^2) are cut down. The United Nations Food and Agriculture Organization (FAO) estimates that during the 1990s, the world suffered a net loss of 95 million hectares of forests – an area larger than Venezuela – with most of the losses occurring in the tropics. The loss of 161 million hectares of natural forests to deforestation was somewhat offset by 15 million hectares of afforestation (deliberate creation of forest where none existed before), 36 million hectares of natural expansion of forests, and 15 million hectares of reforestation.

These losses are critical because forests provide a complex array of vital ecological, social, and economic goods and services. About 60 million people (mainly indigenous and tribal groups) are almost wholly dependent on forests, and another 350 million people who live within or adjacent to dense forests depend on them to a high degree for subsistence and income. In developing countries, about 1.2 billion people (including more than 400 million in Africa; see Box 1) rely on open woodlands or agro-forestry systems that help to sustain agricultural productivity and generate income. Some one billion people worldwide depend on medicines derived from forest plants or rely on common-pool forest resources for meeting essential fuel wood, grazing, and other needs.

At the global level, forests make an important contribution to economic development. Wood and manufactured forest products add more than US$450 billion to the world's market economy each year, and the annual value of internationally traded forest products has been running between US$150 and US$200 billion. The International Labor Organization estimates global forest-based employment (including both industrial and non-industrial forest harvesting and industrialized forest products manufacture) at approximately 47 million; forest-based employment in developing countries accounts for about 32 million of those jobs, or almost 70%.

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[1]This Article has been prepared in collaboration with Diji Chandrasekharan Behr, Elizabeth Cushion, Anne Davis Gillet, Laura Ivers and Nalin Kishor, The World Bank Forests Team.

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The FAO estimates that out of roughly 3.5 billion hectares of global forest area, 1.2 billion are available for industrial wood supply.

Besides providing wood and other products, forests are the repository of the great bulk of terrestrial biodiversity, with all that implies for gene pools, pharmaceuticals, and other unique and valuable goods and services. Forests also contain large amounts of sequestered carbon, and their destruction or degradation (especially by burning) is estimated to contribute between 10% and 30% of all carbon gas emissions into the atmosphere. Deforestation is thus a considerable factor in global warming. In addition, forests help maintain the fertility of agricultural land, protect water sources, and reduce the risks of natural disasters such as landslides and flooding. Mismanagement of woodlands in humid tropical and subtropical countries contributes significantly to soil losses equivalent to 10% of agricultural land and the respective output in those countries each year. In some countries in the Asia-Pacific region, forest destruction is responsible for global biodiversity losses on the order of 2–5% per decade, resulting in inestimable harm to ecosystem stability and human well-being.

Thus, sustainable management of forests is crucial for poverty reduction in many developing countries. Many of the rural poor rely on forests for both subsistence and income. Small-scale forest product processing and trade are often important activities in rural economies. The forest-products sector in most developing countries continues to be dominated by small and medium-sized enterprises. Forest harvesting and primary processing are characterized by low entry costs, enabling the rural poor to engage in these activities. For countries with large forest endowments, and even for others that have limited forests, if forest issues are not fully incorporated into broad national government and assistance strategies, the overarching goals of poverty reduction are unlikely to be achieved.

Box 1 Why forests matter to Africa

Forests are vital for the welfare of millions in Africa, especially the poor and marginalized. Used wisely, they could improve livelihoods and people's quality of life. The following statistics give a sense of forests' importance to the Continent:

- Over two thirds of Africa's 600 million people rely directly or indirectly on forests for their livelihood, including food security.
- Wood is the primary energy source for at least 70% of African households.
- Forest-related activities account for 10% of GDP in at least 19 African countries and more than 10% of national trade in 10 others.
- Africa is home to 25% of the world's remaining tropical rainforests and contains 20% of the world's biodiversity hotspots.

The ending of violent conflicts in countries such as Angola, the Central African Republic, the Democratic Republic of the Congo, Liberia, Mozambique, Sierra Leone, and Sudan would present new opportunities to support sustainable forest management. African countries can also take advantage of a growing national and global demand for forest goods and services.

Source: Centre for International Forestry Research.

The Forces and Dynamics Affecting the World's Forests

The forest sector represents one of the most challenging areas in the development of community and global public policy. Despite significant resource flows, international concern, and political pressure, a combination of market and institutional failures has led to forests failing to realize their potential to reduce poverty, promote economic growth, and be valued for their contributions to the local and global environment.

Forest Law Enforcement and Governance

Many countries with substantial forest resources have been subject to corruption and serious inadequacies in how forests have been allocated, administered, and monitored. Despite their great economic value, forests are one of developing countries' most mismanaged resources, with both political and business elites sharing the blame. Illegal logging and the associated trade and corruption at high political levels flourish because timber rights provide an extremely valuable reward for services to political elites. Besides channeling potential timber revenue away from national development efforts, particularly from the people living in and near the forests, the low prices at which these concessions are often granted encourage waste, unsustainable management, plundering for short-term gain, and replacement by less valuable and less sustainable activities. Such loss and degradation have come at the expense not only of national economies, but also of the rural people who depend on forest resources for their livelihood. This mismanagement translates into enormous national costs. For example, failure to collect appropriate royalties and taxes from legal forest operations costs governments around US$5 billion annually. Illegal logging results in additional losses of forest resources from public lands of at least US$10 billion to US$15 billion a year. Improvements in forest law enforcement and governance are critical to capturing the full economic potential of forests in a sustainable manner.

The private sector provides a principal source of finance to the forest sector. A recent estimate indicates this to be of the order of US$15 billion per annum, and the trend is sharply upwards (Mid-Term Review of Implementation of the World Bank's Forests Strategy, Washington DC 2008). Domestic public-sector financing is estimated to be stable at US$8–10 billion, whereas official development assistance (ODA) is about US$1.5 billion, and appears to be on a declining path. Clearly, the level of activity and influence of the private sector in forests dwarfs that of the international community (ODA), and, given the spending trend, in the future, private investments will likely dominate public investments – and sometimes those of the national government. Clearly, the legal and regulatory frameworks that support sustainable forest practices must be developed to promote responsible private-sector investment, eliminate corruption, and develop innovative financing options and markets for environmental services, such as ecotourism, carbon offsets, and biodiversity conservation.

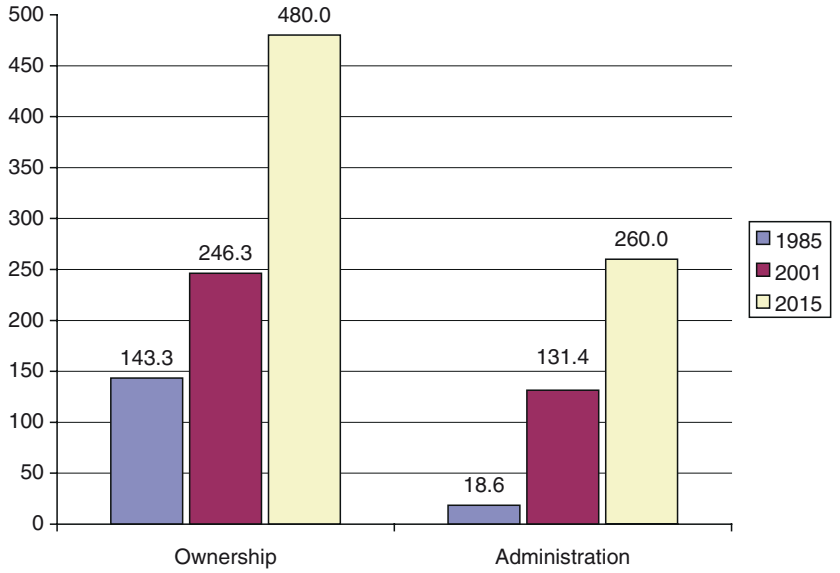

Fig. 1 Forest area under community ownership or community administration worldwide, 1985–2015. Millions of hectares (*see Color Plate*)

Local communities are playing an increasingly important role in forest management. Studies on the ownership and administration of forests indicate that there will be a near doubling of forest area under recognized community ownership and a doubling of the area reserved for community administration between 2001 and 2015 (Fig. 1). Widespread evidence is available to support the assertion that community participation in decision-making and implementation is essential for good governance, equitable distribution of benefits, and sustainable resource management (Springate-Baginski and Blaikie 2007).

Forests in Poverty-Reduction Strategies

Many of the world's poor depend on forests for their livelihoods. Forests can therefore play a significant role in realizing the Millennium Development Goal of halving the number of people living in absolute poverty by 2015. Unfortunately, rural development strategies have often neglected forests because they have been mistakenly viewed as being outside the mainstream of agricultural development. However, conservation and production must coexist if forests' full potential for poverty reduction is to be realized. Although large areas of the world's forests must be preserved intact for their ecological and cultural value, much of what remains will

inevitably be used for productive purposes. In addition to the lumber-and-wood-products industry, the gathering and marketing of hundreds of forest products like forest fruits, fuel wood, and medicinal products constitute an economic activity of enormous scale. Consequently, a dual approach covering both protection and productive use is needed. Efforts to improve sustainable use and management in the productive sector must accompany continued efforts toward protection and conservation.

Using forests for poverty reduction also requires a strong institutional framework and an effective legal and regulatory environment in which the rights of specific groups among the poor are recognized and protected. Additionally, opportunities to develop sustainable forest businesses must be provided to these and other groups. Therefore, development organizations need an approach that focuses on participation and conflict resolution, and not just on the technical and economic aspects of forestry.

Global Values from Forests

Forests play a critical role in balancing the global climate through carbon storage, and they serve as the repository for most of the planet's terrestrial biodiversity. In both these roles, forests constitute global public goods that must be both protected and managed sustainably in order to be maintained. Although biodiversity and key environmental services have traditionally been sustained through the establishment of protected areas in some cases where land tenure was secure, the wide current and future range of competing forest uses by diverse groups imposes constraints on how much can be achieved by protection alone. Improving forest management practices in production forests (forests where productive use is permitted) is an essential component of any strategy to protect vital local environmental services, in addition to efforts aimed at bolstering the effectiveness of management within protected areas.

Although some forest products, primarily lumber and fuel wood, are delivered through markets, the economic value of many of the other contributions of forests to the environment, to biodiversity, and to the stability of the global climate go unrecognized by the market. Creative new mechanisms are needed to ensure that the costs of any loss of forests' environmental services are paid for by those responsible. It is highly unlikely, however, that governments will be able to significantly scale down lumber extraction to preserve forests for their environmental services unless the costs in terms of forgone revenue can be offset in some way. Moreover, very few countries would be prepared to borrow funds – from the World Bank or other sources – to finance forest protection as a substitute for forest production. Innovative financing options and markets for forests' environmental services, such as ecotourism, carbon offsets, and watershed management, will all have important roles to play. As carbon credits grow in value under a future global carbon trading system, there will be increasing incentives to invest in the establishment of new forested areas for their carbon benefits.

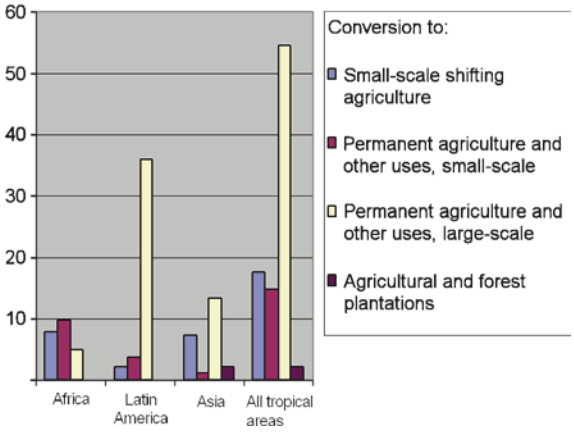

Fig. 2 Main causes of deforestation by world region, 1990–2000. Millions of hectares (*see Color Plate*)

Demand

As human populations grow and countries around the world become more affluent, the demand for wood forest products, both solid wood and pulp and paper, will increase as well. In 2005, removals of roundwood (wood in its natural state, as felled or harvested) were forecast to be valued at around US$64 billion, an increase of about 11% over the previous 15 years. The demand for non-wood forest products has also increased slightly since 1990, with removals estimated at US$4.7 billion. Furthermore, with growing populations, there is an increase in the clearing of forests for agriculture (Fig. 2). The FAO estimates that each year farmers permanently convert 13 million hectares of forest to agriculture, mainly in the tropics. Spillovers from poor policies in other sectors can also contribute to rapid rates of deforestation. This has been particularly evident in recent decades, for example in the conversion of forest areas to oil palm plantations in Indonesia. Pressures on forests from poorly aligned strategies in agriculture, transportation, energy, and industry, as well as unsound macroeconomic policies, are major causes of forest loss and degradation. Cross-sectoral cooperation to coordinate policies is essential to avoid forest degradation and to ensure that forests are managed in a sustainable manner.

Some Controversies Surrounding Forests

Forests and Poverty Reduction

Forests can be used to help alleviate poverty, but views differ on how this should be done. The poor are not a homogeneous group with respect to their use of forests. Among the poor are some who depend heavily on forests for their subsistence and

livelihoods, whereas others have a higher level of industrial or artisanal skills and access to markets, and therefore different forest needs. If too much emphasis is placed on building the poor's participation in market-based use of forests, those groups who need to use the forests communally for subsistence may be excluded. It is therefore essential to ensure that market opportunities are assessed realistically and that groups are not set against each other in a limited market. Appropriate collective control and management are also needed in community forest management systems to ensure that liberalization of markets and privatization of state forest and other enterprises benefit the poor. Additionally, such controls should be incorporated into any program or initiative targeted at poverty reduction, including payment for environmental-services schemes, to ensure that the funds reach the intended beneficiaries.

Governance Issues

Another area of potential conflict is that between state ownership of forests and the interests of communal and smallholder producers, who frequently are poor. These groups are often excluded, whether deliberately by policy or through failures in sector governance, from adequate participation in the commercial use of forests. Additionally, many of the world's indigenous peoples live within or near forests and are among the poorest, most vulnerable, and most powerless groups in developing countries. Their tenure rights, in forest areas in particular, tend to be insecure. It is clear that policies and institutional and legal reforms that establish and protect the rights of indigenous peoples – in a number of areas including forest use – are needed in many countries.

Devolution of management of forests to lower levels of government or local community groups is widely considered essential for good governance, equitable distribution of benefits, and sustainable resource management. However, the implementation of these schemes has often resulted in their being hijacked by local elites and the creation of conflict in local communities. The result has been unsustainable forest management and social disruption. Furthermore, issues of gender equality in access to forest resources have often not been adequately addressed when forest management has been decentralized. Such matters need to be taken on board in any decentralization or devolution process to ensure that systems for equitable benefit sharing and sustainable management are put in place.

Protecting Global Environmental Services

One of the problems inherent in protecting forests is that forests are in high demand for a range of often mutually-exclusive uses by competing groups within society. Some conservation groups and policymakers mistakenly assume that the worldwide

interest in protecting and preserving forests for their biodiversity and other global values will always converge with the interests of the forest-dependent poor. Although in most cases the poor do share an interest in protecting an environment that will enable them to maintain their livelihoods, this does not necessarily imply a complete congruence of interests: the poor may prefer to change the existing forest landscape in ways that may not meet the interests of international stakeholders. The development of incentives, such as payment for environmental services, that will balance local and global demands, thus needs careful consideration and further development.

Actions of the International Community Toward Sustainable Forest Management

In the last 15 years, the legal and international framework that governs forest issues has advanced and broadened. The main agreements that affect the forest sector are the conventions and processes arising from the 1992 United Nations Conference on Environment and Development held in Rio de Janeiro (the Rio Earth Summit) and from subsequent United Nations forums that focus on forests, specifically the Convention on Biological Diversity, the Convention to Combat Desertification, the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, and the international dialogue on forests, which has culminated in the United Nations Forum on Forests (UNFF). The Convention on International Trade in Endangered Species (CITES) also addresses some aspects of forest management. Additionally, innovations by non-governmental organizations (NGOs) and civil society, such as the development of forest certification schemes, have made important contributions to global sustainable forest management.

The Rio Earth Summit

At the 1992 Rio Earth Summit, forest-related topics tended to polarize developing and developed countries and became some of the most controversial issues. Intense negotiations among governments resulted in an authoritative but non-legally binding statement of “Principles for a Global Consensus on Management, Conservation, and Sustainable Development of All Types of Forests”. This declaration affirmed that states have sovereign rights over their natural resources, but also recognized that forests are a global public good that provides ecosystem services of global value and significance, such as biodiversity preservation, carbon sequestration, and nutrient and hydrological cycling. Ultimately, agreements emerging from the Rio Summit had the enhancement of the scope and effectiveness of national institutions in developed and developing countries related to management, conservation, and sustainable development of forests as their objective. Lending organizations such

as the World Bank are obliged to assist their clients in meeting the commitments and international conventions arising from the Rio Summit.

The Kyoto Protocol

The negotiation of the 1997 Kyoto Protocol to the UNFCCC established global commitments to mitigate climate change and created three "flexible mechanisms" to achieve this objective. Two of these relate directly to the forest sector. The first allows parties from developed countries and countries in transition from socialism to transfer or acquire emissions-reduction units from any other party. This mechanism, called Joint Implementation, could play an important role in supporting sustainable forest management in transition countries. The second mechanism, the Clean Development Mechanism (CDM), regulates greenhouse gas (GHG) emissions trading between industrial countries and developing countries. Forests could play a role in the CDM by integrating forest management and conservation through reforestation and afforestation. Such integration could mobilize substantial resource flows to developing countries. The third mechanism is emissions trading, for which a market for emission reductions was created.

The first commitment period under the Kyoto Protocol is through 2012, and negotiations are under way to establish parameters for the next commitment period. Recently, methods for reduction of GHG emissions from deforestation have received considerable attention, with the new concept of avoided deforestation as a means of compliance on the negotiating table. Agreement was reached at the thirteenth Conference of Parties (COP) of the UNFCCC in Bali in December 2007 whereby the emerging framework for negotiations will incorporate mitigation of climate change: for the first time, this will include consideration of reducing emissions from deforestation, sustainable forest management, reforestation, afforestation, and forest and land degradation, adaptation, technology development and transfer, and provision of financial resources in support of developing countries' actions. COP13 emphasized the need to address the drivers of deforestation to achieve outcomes in emission reductions from deforestation and degradation. The Conference of the Parties at its fourteenth session in Poznan in December 14, 2009 reiterated the important role of forests, with a view to reach a global agreement at its final negotiations in Copenhagen in 2009.

The United Nations Forum on Forests

Significant progress has been made in the international dialogue on forests since the Rio Summit. During that time, the main focus within the United Nations has been to continue to develop coherent policies to promote the management, conservation, and sustainable development of all types of forests. The Intergovernmental Panel on Forests (IPF), from 1995 to 1997, and the Intergovernmental Forum on Forests (IFF),