SUSTAINABLE FORESTS

Edited by
Jeffrey Sayer, Neil Byron and
Gillian Petrokofsky

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Volume I
Forests, Landscapes and Conservation

Associate Editors
Jeffrey Sayer and Douglas Sheil

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These volumes are dedicated to our friend and former colleague Paul Jarvis (d. February 2013), editor of Volume 2, in recognition of his invaluable contribution to our understanding of forest science.

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SUSTAINABLE FORESTS

Edited by **Jeffrey Sayer**, **Neil Byron** *and* **Gillian Petrokofsky**

This four-volume set is edited by leading experts on the evolving role of forests in providing raw materials and environmental services to meet society's changing needs. It brings together in one collection a series of papers that have helped to shape thinking on forests as a key sustainable resource. The collection includes some classic papers but is mainly composed of more recent publications at the cutting edge of thinking on forests and their sustainable use. The set includes a general introduction and each volume is introduced by a new overview essay, placing the selected papers in context. The breadth of subject matter is considerable, ranging from the management and conservation of forest landscapes, soils, hydrology and tree-atmosphere relations, socio-economic aspects including the livelihoods of indigenous people, policy and economics, to contemporary issues such as ecosystem services and climate change.

Editors

Jeffrey Sayer is Professor of Conservation and Development at James Cook University, Queensland, Australia, and a member of the Independent Science and Partnership Council of the Consultative Group for International Agricultural Research. He was founding Director General of the Center for International Forestry Research (CIFOR) in Indonesia.

Neil Byron is an Adjunct Professor at the University of Canberra in Australia. He was Commissioner of Australia's Productivity Commission with special responsibility on Environment and Natural Resources from 1998–2009, and before that Assistant Director General of the Center for International Forestry Research in Indonesia.

Gillian Petrokofsky is the former Head of the Forestry section at CAB International and Editor of Forest Products Abstracts, and is now at the Biodiversity Institute, University of Oxford, UK.

Associate Editors

Bas Arts is a Professor in the Forest and Nature Conservation Policy Group, Wageningen University, Wageningen UR, The Netherlands.

Paul Jarvis was Emeritus Professor of Forestry and Natural Resources at the University of Edinburgh, UK.

Margaret Shannon is Coordinator of the European Forest Institute Program on Forest Policy and Economics Education and Research in Southeast Europe, based in Croatia. She is also a Professor at the Rubenstein School of Environment and Natural Resources, University of Vermont, USA, and Professor in Honor, Faculty of Forestry and Environmental Science, University of Freiburg, Germany.

Douglas Sheil is currently a Professor in the School of Environment, Science and Engineering, Southern Cross University, Australia. He has been Director of the Institute of Tropical Forest Conservation, Mbarara University of Science and Technology, Uganda, and is also a Senior Research Associate with the Center for International Forest Research (CIFOR), Indonesia.

Victor Teplyakov is a Professor in the Department of Forest Sciences, Seoul National University, Korea.

PREFACE

Forestry used to be a pretty straightforward, technical discipline; it was preoccupied with stability and maintaining the status quo. It concerned itself with management interventions today to ensure the supply of a limited number of goods and services, often in the relatively distant future. The profession of forester was a secure, respectable middle-class occupation that often came with a smart uniform. Now that has changed radically. In the past few decades forests have become the concern of everyone. The media are full of forest stories, mostly portraying catastrophic losses of forests and their resources. Forest issues are debated at global political summits and amongst the people of small communities. The understanding and practice of sustainable forestry is being constantly reinvented. These four volumes bring together papers published in the recent past that illustrate and reflect this evolving concern about the world's forests.

Throughout the world, the quest for "Sustainable Forests" now pre-occupies governments, communities, environmental and social non-governmental organisations, researchers and land managers (including forestry practitioners and protected area managers). Our concern in editing these volumes is to help make the basic empirical knowledge of forest processes more readily available to the increasing range of people who aspire to influence the "forest agenda".

Concern about the health, condition and extent of forests has been around for centuries, as have concerns about the well-being and prospects for the people who live in/near forests and depend on them. Many people believe that concern for forests was a major driver of the way nation-states came to organise themselves – the imperative of managing the common property resources at various spatial scales upon which all societies depend.

But, especially since the 1980s when the United Nations Development Programme and Food and Agriculture Organization initiated the Tropical Forest Action Plan, public and professional concerns about massive tropical deforestation, the continuing degradation of forests in many regions and the multiple demands that societies now place upon forests and trees has grown exponentially.

"Our Common Future" – the 1989 report of the World Commission on Environment and Development – raised the banner of "***Sustainable Development***". It brought much greater attention to the quest to re-balance environmental protection and economic growth around the world. Many people who were interested in forests, forested landscapes and forest-dependent people almost immediately began to wonder how the same sustainable development principles and goals might apply in the context of forests. The WCED was soon followed by a World Commission on Forests and Sustainable Development which reported in 1995. A number of pictures began to emerge in various countries, of what sustainable (or at least "significantly more sustainable") forests might look like, and what sort of forest – and landscape-management practices – might achieve such goals. The Rio Earth summit in 1992 invested a lot of energy into attempts to formulate legally binding agreements on forests – but its inability to negotiate a strong and meaningful agreement merely served to underline how different societies valued forests and the land upon which they grew in quite different ways.

A number of forest events came to occupy political and public opinion. Acid rain in Europe, forest fires in the Mediterranean and logging of hitherto pristine forests in the tropics became icons of the environmental movement. The plight of forest dwelling indigenous people aroused sympathy around the world. The "Spotted Owl" debate in the USA Pacific Northwest led to a new philosophy of Forest Ecosystem Management which would stress the underlying ecosystem principles for managing forests at large spatial scales for multiple industrial, recreational and aesthetic purposes. The Forest Stewardship Council (FSC) was born as an NGO initiative to encourage more sustainable forests by using consumer pressure on the supply chain, through the importers and retailers of timber in western countries. The Montreal Process led to a set of "Principles, Criteria and Indicators for Sustainable Forest Management (SFM)" that have been developed in the hope/expectation of global application. Similar principles and criteria have now emerged in various parts of the world.

So there were – and still are – many different perceptions of sustainable forests, and each of them is internally complex, multi-dimensional and challenging and in their context valid. Some are still a work in progress, they have internal contradictions and inconsistencies, or require a skill set that very few agencies (let alone individuals) could possess and apply.

While the public and governments have very high expectations and ambitions for the future of their forests, many researchers and practitioners at the forest edge find these challenges to be profoundly daunting. Many are left wondering what to do and how to meet this great ambitious aspiration, especially when the *specific* challenges of caring for forests long-term – on an ecologically, socially and economically sustainable basis – vary so much through space and time.

Forestry and environmental management specialists in many countries feel overwhelmed – sometimes confused and sometimes inadequately equipped to answer society's challenge. In many cases they also feel disempowered as the decision making about forests is shifting to a diversity of civil society and governmental agencies that have no formal training in conventional forestry. Just as the public is more concerned than ever about forests so students are less interested in studying forestry and opt instead for "Environmental Sciences". This volume is aimed to a large extent at this audience of non-foresters and aims to demonstrate to them that forest science has still a lot to offer in achieving sustainable forests.

The publishers agreed to produce this set of articles as a contribution to this rich debate on forests and their sustainability. The aim is to help equip concerned people with the knowledge needed to meet these great challenges. The set is aimed at the many well-intentioned and highly motivated people working on and in forests globally.

Many libraries have limited journal stocks and cannot afford back issues or the comprehensive electronic digitized resources sometimes offered by publishers. This is particularly true of smaller universities and colleges in the developed world and of even the larger universities in developing economies such as Eastern Europe, Africa and Asia, where they are only comparatively recently developing their academic libraries.

We hope that the introductory overview chapters in each volume will be particularly valuable in providing a review of key literature for lecturers and students, who are otherwise faced with thousands of papers to sift through in their subjects. In many cases both lecturers and students, and even researchers, are often unaware of the value of certain classic older papers or reports from the grey literature, or literature from other hemispheres. We have therefore brought together and put into context a coherent set of inter-related papers on priority emerging issues. The aim is to present those papers which either strongly influenced the development of new approaches to forests or which deserve greater recognition for the insights that they contain. There are countless ways of attempting to organise all this material – e.g. what do people do to forests and why, what are the consequences and how are those consequences dealt with by society? We have chosen to group the papers around what we perceive as the major current themes of the sustainable forest discourse.

As editors, we have sought out not only the most influential, but also some very important but perhaps under-recognised papers with real merit, and grouped them by topics that not only reflect current "hot issues" but perhaps some "sleepers" that we believe will become increasingly important. This is a little like judging a beauty contest, and any expert panel would probably disagree on the top 20 journal articles in any particular field. We have also tried to compile a suite of high-quality readings that would be particularly

useful to developing country institutions which lack access to major journals (or more boutique journals, grey literature, NGO reports, etc.). We have tried to find a major conceptual or synthesis paper and 2–3 more detailed local examples for each of those issues.

Although all the articles in these four volumes are written in English, the editors have attempted to ensure that African, Latin American, Chinese and European authors are represented, not just USA/UK authors, and a wide coverage of the "case-study" papers. For example, the Brazilian forest economist Alfredo Homma is well known and highly respected amongst scholars writing in Portuguese and Spanish, but the paper included in Volume III is one of the very few examples of his world-class work available in English.

This 4-volume set may be seen as a surrogate textbook, particularly for those interdisciplinary courses (e.g. including geography, biodiversity conservation, environmental change, sustainable development, not just in forestry) which are focusing on emerging issues. Although each volume has its own strong theme, the editors have tried to ensure that all four volumes were connected (such as through cross-referencing between volumes); this emphasises the synthesis of different kinds of scientific knowledge – each of the four volumes is not an isolated silo.

The editors are confident that this wide-ranging collection of carefully-selected articles will help deepen understanding and stimulate debate about the crucial role of forests in sustainable development. The science that underpins sustainable forestry has expanded its horizons in the past few decades – forestry is no longer a technical skill centred on a narrow discipline – the people managing forests are drawing upon the skills and competencies of a wide range of scientists and practitioners. Civil society is asserting its right to be the ultimate judge of what sort of forests we need, how much of them we want and where they should be. Societies' expectations of forests will certainly change in the future as more people move to cities and climate change creates new threats and opportunities for forests. Forest science will and should continue to evolve and adapt – and a study of the papers in these four volumes will provide an excellent grounding for anyone who wants to engage with these processes in the future.

Overview of the scope of the four volumes

Volume I

Forests, landscapes and conservation

This is a theme which has recently risen in prominence since the sixth Forest Day in Doha, Qatar, on 2 December 2012. Volume I, edited by Jeffrey Sayer and Douglas Sheil, covers this very broad topic, in seven parts. The first two

parts, "Overview and contexts" and "History and modern classics", highlight historical and recurring conservation themes and discuss the conceptual development of forest conservation planning. The third part, "Beyond the pristine" considers the value of tree cover outside "natural" forest settings, an important consideration for a landscape approach to conservation. The fourth part "Concerning methods" examines some of the important methods used to research these themes, from field surveys of biodiversity to multi-scale monitoring of landscapes. The questions of how forest landscapes should be managed and by whom, are posed in Part 5, "Governance and oversight". The sixth and seventh parts, "Taking stock" and "The road ahead" review what we already know, what we need to know and what approaches might be needed to make forest conservation more effective in the future.

Volume II

Forests and the physical, chemical and biological environment

This volume, edited by the late Paul Jarvis, discusses environmental processes across the soil-tree-forest-troposphere-climate continuum in five parts. The first, "Forest and tree properties", focuses particularly on the mass and area of foliage carried by trees. The second part, "Radiation, energy and production", looks at interception of solar radiation and canopy structure, solar radiation reflectance and energy exchanges. The third part reviews a broad range of factors that affect "Transpiration and evaporation" in forests, and discusses in some details the Soil-Plant-Atmosphere-Continuum (SPAC). Part 4, "Forest carbon, tropospheric CO_2 and forest management" examines the processes involved in the removal of carbon dioxide from the atmosphere and the current interest in "carbon forestry", which is concerned with the conservation and enhancement of the stocks of carbon in forests through modification of practical forest management. Part 5, "Likely impacts of climate change", discusses the role of carbon dioxide, temperature, nitrogen stimulated carbon sequestration in forest and agricultural land and the role of nitrous dioxide in likely forest responses to climate change.

Volume III

Forests, people and livelihoods

This volume, edited by Neil Byron, takes a historical approach to the literature, identifying three distinct periods: an emergence/discovery phase, a consolidation/experimentation phase and a mainstreaming phase in each of seven main parts. The first part, "Access and tenure seeks to understand who has driven the changes in forest use and condition, and why and how changes have been brought about. Part 2, "Importance of traditional and indigenous

uses" asks a related set of questions about what forest goods and services are valued by traditional forest users. Part 3, "Emerging markets for Non Timber Forest Products", discusses how people could be lifted out of poverty by the commercialisation and enhanced marketing of NTFPs on domestic and international markets. Part 4, "Participation and gender", and Part 5, "Challenges in implementing community forestry", track the development of participatory forestry and gender-balanced processes in decision making and reflect on the widely differing experiences of community-based forest management. Part 6, "Agroforestry, small-holder farm forestry and urban forestry", traces evolution of attitudes and practices dealing with trees outside forests. The final part, "Lessons for the West?" focuses particularly on the debates about payment for ecosystem services, and on institutions for participatory, collaborative resource management.

Volume IV

Forest policy, economics and governance

This volume edited by Margaret Shannon, Bas Arts, Victor Teplyakov and Gillian Petrokofsky, provides a broad discussion of the governance, policy, law and economics of "sustainable forests", drawing on theory and practice in three main sections. Part 1, "Emerging regime of global forest governance", traces the emergence of new institutions, new policies, new legal regimes and new problem definitions for international forestry. Part 2, "Role of science and economics in forest policy and governance", illustrates how global forest governance is a complex and evolving practice aimed at the lodestar of sustainability and includes papers that examine how science is not separate from the practice or policy of sustainable forestry, but is fully integrated with the entire process. Part 3, "Markets as models for policy and new modes of governance", examines certification of sustainable forest management and, using a different lens from that used in Volume III, the development of markets for ecological services, particularly through payments for environmental services.

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Chronological table of reprinted articles and chapters

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1957	J. R. Philip	The physical principles of soil water movement during the irrigation cycle	Proceedings of the Third International Congress of Irrigation and Drainage, JCID, International Commission on Irrigation and Drainage, pp. 125–54.	II	40
1976	P. G. Jarvis	The interpretation of the variations in leaf water potential and stomatal conductance found in canopies in the field	*Philosophical Transactions of the Royal Society of London* B, 273, 593–610.	II	39
1982	R. H. Waring, P. E. Schroeder and R. Oren	Application of the pipe model theory to predict canopy leaf area	*Canada Journal of Forest Research*, 12, 556–60.	II	31
1983	P. G. Jarvis and J. W. Leverenz	Productivity of temperate, deciduous and evergreen forests	O. L. Lange, P. S. Nobel, C. B. Osmond and H. Ziegler (eds), *Encyclopedia of Plant Physiology*, New Series, *Physiological Plant Ecology IV*, Vol. 12D, Berlin, Heidelberg: Springer-Verlag, 1983, pp. 233–80.	II	35
1985	S. Linder	Potential and actual production in Australian forest stands	J. J. Landsberg and W. Parsons (eds), *Research for Forest Management*, Melbourne: CSIRO, pp. 11–35.	II	34
1986	P. G. Jarvis and K. G. McNaughton	Stomatal control of transpiration: scaling up from leaf to region	*Advances in Ecology Research*, 15, 1–49.	II	38
1990	Y. P. Wang, P. G. Jarvis and M. L. Benson	Two-dimensional needle-area density distribution within the crowns of *Pinus radiata* trees	*Forest Ecology and Management*, 32, 217–37.	II	32
1994	J. L. Monteith	Fifty years of potential evaporation	T. Keane and E. Daly (eds), *The Balance of Water – Present and Future*, Proceedings of the AGMET Group (Ireland) and the Agricultural Group of the Royal Meteorological Society (UK) Conference, September 7–9, 1994, Trinity College, Dublin, pp. 29–45.	II	37

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1996	A. K. O. Homma	Modernisation and technological dualism in the extractive economy in Amazonia	M. Ruiz Pérez and J. E. M. Arnold (eds), *Current Issues in Non-timber Forest Products*, Research Proceedings of the workshop "Research on NTFP", Hot Springs, Zimbabwe, 28 August–2 September 1995, Bogor, Indonesia: Centre for International Forestry Research (CIFOR), pp. 59–82.	III	57
1996	I. M. Turner and R. T. Corlett	The conservation value of small, isolated fragments of lowland tropical rain forest	*Trends in Ecology and Evolution*, 11:8, 330–33.	I	7
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1997	F. H. J. Crome	Researching tropical forest fragmentation: shall we keep on doing what we're doing?	William F. Laurence and Richard O. Bierregaard, Jr (eds), *Tropical Forest Remnants: Ecology, Management, and Conservation of Fragmented Communities*, Chicago: University of Chicago Press, pp. 485–501.	I	8
1997	J. J. Landsberg, S. D. Prince, P. G. Jarvis, R. E. McMurtrie, R. Luxmoore and B. E. Medlyn	Energy conversion and use in forests: an analysis of forest production in terms of radiation utilisation efficiency (ε)	H. L. Gholz, K. Nakane and H. Shimoda (eds), *The Use of Remote Sensing in the Modeling of Forest Productivity at Scales from the Stand to the Globe*, Dordrecht: Kluwer Academic, Publishers, pp. 273–98.	II	36

1997	M. Richards	Common property resource institutions and forest management in Latin America	*Development and Change*, 28, 95–117.	III	49
1997	D. Rocheleau and D. Edmunds	Women, men and trees: gender, power and property in forest and agrarian landscapes	*World Development*, 25:8, 1351–71.	III	59
1997	K. F. Wiersum	Indigenous exploitation and management of tropical forest resources: an evolutionary continuum in forest–people interactions	*Agriculture, Ecosystems and Environment*, 63, 1–16.	III	53
1998	M. G. R. Cannell, J. H. M. Thornley, D. C. Mobbs and A. D. Friend	UK conifer forests may be growing faster in response to increased N deposition, atmospheric CO_2 and temperature	*Forestry*, 71:4, 277–96.	II	45
1999	A. J. Long and P. K. Ramachandran Nair	Trees outside forests: agro-, community and urban forestry	*New Forests*, 17, 145–74.	III	68
1999	Y. Malhi, D. D. Baldocchi and P. G. Jarvis	The carbon balance of tropical, temperate and boreal forests	*Plant, Cell and Environment*, 22, 715–40.	II	29
1999	E. Ostrom	Self-governance and forest resources	CIFOR Occasional Paper, No. 20. Bogor, Indonesia: Center for International Forestry Research.	III	47
1999	S. Tuler and T. Webler	Voices from the forest: what participants expect of a public participation process	*Society and Natural Resources*, 12, 437–53.	III	60
2001	B. Campbell, A. Mandondo, N. Nemarundwe, B. Sithole, W. De Jong, M. Luckert and F. Matose	Challenges to proponents of common property resource systems: despairing voices from the social forests of Zimbabwe	*World Development*, 29:4, 589–600.	III	48
2001	G. Heal, G. C. Daily, P. R. Ehrlich, J. Salzman, C. Boggs, J. Hellmann, J. Hughes, C. Kremen and T. Ricketts	Protecting natural capital through ecosystem service districts	*Stanford Environmental Law Journal*, 20, 333–64.	IV	84
2001	P. G. Jarvis and D. G. Fowler	Forests and the atmosphere	J. Evans (ed.), *The Forests Handbook*, Vol. 1, Oxford: Blackwell, pp. 229–81.	II	28

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2001	G. Lescuyer, A. Emerit, E. E. Mendoula and J. J. Seh	Community involvement in forest management: a full-scale experiment in the South Cameroon Forest	Rural Development Forestry Network Paper, No. 24, London: Overseas Development Institute.	III	61
2001	H. Rangan and M. B. Lane	Indigenous peoples and forest management: comparative analysis of institutional approaches in Australia and India	*Society and Natural Resources*, 14, 145–60.	III	51
2002	B. Cashore	Legitimacy and the privatization of environmental governance: how non-state market-driven (NSMD) governance systems gain rule-making authority	*Governance*, 15:4, 503–29.	IV	88
2002	S. E. Kingsland	Creating a science of nature reserve design: perspectives from history	*Environmental Modeling and Assessment*, 7, 61–69.	I	5
2002	B. E. Law, E. Falge, L. Gu, D. D. Baldocchi, P. Bakwin, P. Berbigier, K. Davis, A. J. Dolman, M. Falk, J. D. Fuentes, A. Goldstein, A. Granier, A. Grelle, D. Hollinger, I. A. Janssens, P. Jarvis, N. O. Jensen, G. Katul, Y. Malhi, G. Matteucci, T. Meyers, R. Monson, W. Munger, W. Oechel, R. Olson, K. Pilegaard, K. T. Paw, U. H. Thorgeirsson, R. Valentini, S. Verma, T. Vesala, K. Wilson and S. Wofsy	Environmental controls over carbon dioxide and water vapour exchange of terrestrial vegetation	*Agricultural and Forest Meteorology*, 113, 97–120.	II	42

2002	P. Meir, B. Kruijt, M. Broadmeadow, E. Barbosa, O. Kull, F. Carswell, A. Nobre and P. G. Jarvis	Acclimation of photosynthetic capacity to irradiance in tree canopies in relation to leaf nitrogen concentration and leaf mass per unit area	*Plant, Cell and Environment*, 25, 343–57.	II	44
2002	E. Ramensteiner	The role of governments in forest certification: a normative analysis based upon new institutional economics theories	*Forest Policy and Economics*, 4, 163–73.	IV	87
2002	D. Sheil and S. Wunder	The value of tropical forest to local communities: complications, caveats and cautions	*Conservation Ecology*, 6:2, 15pp.	III	55
2003	A. Balmford, K. J. Gaston, S. Blyth, A. James and V. Kapos	Global variation in terrestrial conservation costs, conservation benefits and unmet conservation needs	*Proceedings of the National Academy of Sciences of the United States of America*, 100:3, 1046–50.	I	2
2003	S. Kant	Extending the boundaries of forest economics	*Forest Policy and Economics*, 5, 39–56.	IV	82
2003	C. C. Konijnendijk	A decade of urban forestry in Europe	*Forest Policy and Economics*, 5, 173–86.	III	69
2003	Y. B. Malla, H. R. Neupane and P. J. Branney	Why aren't poor people benefiting more from community forestry?	*Journal of Forest and Livelihood*, 3:1 (Special issue on Community Forestry in Nepal), 78–92.	III	63
2003	D. Pearce, F. E. Putz and J. K. Vanclay	Sustainable forestry in the tropics: panacea or folly?	*Forest Ecology and Management*, 172, 229–47.	III	65
2004	D. B. Bray, E. A. Ellis, N. Armijo-Canto and C. T. Beck	The institutional drivers of sustainable landscapes: a case study of the "Mayan Zone" in Quintana Roo, Mexico	*Land Use Policy*, 21, 333–46.	I	21
2004	I. Røpke	The early history of modern ecological economics	*Ecological Economics*, 50, 293–314.	IV	83
2004	V. Teplyakov	The power of the past	*Silva Carelica of Joensuu University*, 46, 17–40.	IV	78

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Date	*Author*	*Title*	*Source*	*Vol.*	*Ch.*
2004	S. Wang	One hundred faces of sustainable forest management	*Forest Policy and Economics*, 6, 205–13.	IV	81
2004	L. A. Wily	Can we own the forest? Looking at the changing tenure environment for community forestry in Africa	*Forests, Trees and Livelihoods*, 14, 217–28.	III	50
2005	S. A. Bhagwat, C. G. Kushalappa, P. H. Williams and N. D. Brown	A landscape approach to biodiversity conservation of sacred groves in the Western Ghats of India	*Conservation Biology*, 19:6, 1853–62.	I	13
2005	L. E. Eastwood	Civil society, NGOs and transnational corporations: setting the stage for international environmental policy negotiations	L. E. Eastwood, *The Social Organization of Policy: An Institutional Ethnography of the United Nations Intergovernmental Forum on Forests*, New York: Routledge, pp. 1–25.	IV	76
2005	J. Grace	Role of forest biomes in the global carbon balance	H. Griffiths and P. G. Jarvis (eds), *The Carbon Balance of Forest Biomes*, Abingdon & New York: Taylor & Francis, London: pp. 19–45.	II	41
2005	D. Klooster	Environmental certification of forests: the evolution of environmental governance in a commodity network	*Journal of Rural Studies*, 21, 403–17.	IV	85
2005	P. Levang, E. Dounias and S. Sitorius	Out of the forest, out of poverty?	*Forests, Trees and Livelihoods*, 15, 211–35.	III	64
2005	G. Rambaldi	Who owns the map legend?	Paper presented at the 7th International Conference on GIS for Developing Countries (GISDECO 2004), 10–12 May 2004, Universiti Teknologi Malaysia, Johor Malaysia, *Journal of the Urban and Regional Information Systems Association (URISA)*, 17:1, 5–13.	I	17

2005	T. K. Rudel, O. T. Coomes, E. Moran, F. Achard, A. Angelsen, J. Xu and E. Lambin	Forest transitions: towards a global understanding of land use change	*Global Environmental Change*, 15, 23–31.	I	3
2005	W. D. Sunderlin, A. Angelsen, B. Belcher, P. Burgers, R. Nasi, L. Santoso and S. Wunder	Livelihoods, forests and conservation in developing countries: an overview	*World Development*, 33:9, 1383–1402.	III	52
2005	S. Wunder	Payments for environmental services: some nuts and bolts	CIFOR Occasional Paper 42, Bogor, Indonesia: Center for International Forestry Research, pp. 1–24.	IV	90
2006	C. Forner, J. Blaser, F. Jotzo and C. Robledo	Keeping the forest for the climate's sake: avoiding deforestation in developing countries under the UNFCCC	*Climate Policy*, 6:3, 1–20.	III	70
2006	E. D. G. Fraser, A. J. Dougill, W. E. Mabee, M. Reed and P. McAlpine	Bottom up and top down: analysis of participatory processes for sustainability indicator identification as a pathway to community empowerment and sustainable environmental management	*Journal of Environmental Management*, 78, 114–27.	III	62
2006	R. J. Hobbs, S. Arico, J. Aronson, J. S. Baron, P. Bridgewater, V. A. Cramer, P. R. Epstein, J. J. Ewel, C. A. Klink, A. E. Lugo, D. Norton, D. Ojima, D. M. Richardson, E. W. Sanderson, F. Valladares, M. Vilá, R. Zamora and M. Zobel	Novel ecosystems: theoretical and management aspects of the new ecological world order	*Global Ecology and Biogeography*, 15, 1–7.	I	14
2006	D. Humphreys	Intergovernmental panel on forests	D. Humphreys, *Logjam: Deforestation and the Crisis of Global Governance*, London: Earthscan, pp. 22–47.	IV	75

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Date	*Author*	*Title*	*Source*	*Vol.*	*Ch.*
2006	K. Kusters, R. Achdiawan, B. Belcher and M. Ruiz Pérez	Balancing development and conservation? An assessment of livelihood and environmental outcomes of nontimber forest product trade in Asia, Africa and Latin America	*Ecology and Society*, 11:2, 9pp.	III	56
2006	W. F. Laurance	Have we overstated the tropical biodiversity crisis?	*Trends in Ecology and Evolution*, 22:2, 65–70.	I	22
2006	D. Nepstad, S. Schwartzman, B. Bamberger, M. Santilli, D. Ray, P. Schlesinger, P. Lefebvre, A. Alencar, E. Prinz, G. Fiske and A. Rolla	Inhibition of Amazon deforestation and fire by parks and indigenous lands	*Conservation Biology*, 20:1, 65–73.	I	20
2007	M. B. Bush and M. R. Silman	Amazonian exploitation revisited: ecological asymmetry and the policy pendulum	*Frontiers in Ecology and the Environment*, 5:9, 457–65.	I	4
2007	R. Hyvönen, G. I. Ågren, S. Linder, T. Persson, M. F. Cotrufo, A. Ekblad, M. Freeman, A. Grelle, I. A. Janssens, P. G. Jarvis, S. Kellomäki, A. Lindroth, D. Loustau, T. Lundmark, R. J. Norby, R. Oren, K. Pilegaard, M. G. Ryan, B. D. Sigurdsson, M. Strömgren, M. van Oijen and G. Wall	The likely impact of elevated [CO_2], nitrogen deposition, increased temperature and management on carbon sequestration in temperate and boreal forest ecosystems: a literature review	*New Phytologist*, 173, 463–80.	II	43
2007	P. G. Jarvis and S. Linder	Forests remove carbon dioxide from the atmosphere: spruce forest tales!	P. H. Freer-Smith, M. S. J. Broadmeadow and J. M. Lynch (eds), *Forestry and Climate Change*, Proceedings of the OECD Wilton Park Conference 2006, Wallingford: CAB, pp. 60–72.	II	33

2007	D. Lindenmayer, R. J. Hobbs, R. Montague-Drake, J. Alexandra, A. Bennett, M. Burgman, P. Cale, A. Calhoun, V. Cramer, P. Cullen, D. Driscoll, L. Fahrig, J. Fischer, J. Franklin, Y. Haila, M. Hunter, P. Gibbons, S. Lake, G. Luck, C. MacGregor, S. McIntyre, R. M. Nally, A. Manning, J. Miller, H. Mooney, R. Noss, H. Possingham, D. Saunders, F. Schmiegelow, M. Scott, D. Simberloff, T. Sisk, G. Tabor, B. Walker, J. Wiens, J. Woinarski and E. Zavaleta	A checklist for ecological management of landscapes for conservation	*Ecology Letters*, 10, 1–14.	I	27
2007	A. A. Nawir, H. Kassa, M. Sandewall, D. Dore, B. Campbell, B. Ohlsson and M. Bekele	Stimulating smallholder tree planting: lessons from Africa and Asia	*Unasylva 228*, 58, 53–58.	III	67
2007	M. A. Shannon, G. Buttoud and R. Päivinen	Science is endogenous to sustainable forestry: implications for scientists and policymakers	K. M. Reynolds, A. J. Thomson, M. Mohl, M. A. Shannon, and K. Rennolls (eds), *Sustainable Forestry: From Monitoring and Modeling to Knowledge Management and Policy Science*, Wallingford, Oxfordshire: CABI Publishing, pp. 1–13.	IV	79
2007	S. J. Wright, G. A. Sanchez-Azofeifa, C. Portillo-Quintero and D. Davies	Poverty and corruption compromise tropical forest reserves	*Ecological Applications*, 17:5, 1259–66.	I	19

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Date	*Author*	*Title*	*Source*	*Vol.*	*Ch.*
2008	A. Agrawal, A. Chhatre and R. Hardin	Changing governance of the world's forests	*Science*, 320, 1460–62.	IV	72
2008	E. G. Brockerhoff, H. Jactel, J. A. Parrotta, C. P. Quine and J. Sayer	Plantation forests and biodiversity: oxymoron or opportunity?	*Biodiversity and Conservation*, 17, 925–51.	I	12
2008	C. Bunt and R. Leakey	Domestication potential and marketing of *Canarium Indicum* nuts in the Pacific: commercialization and market development	*Forests, Trees and Livelihoods*, 18, 271–89.	III	58
2008	S. Engel, S. Pagiola and S. Wunder	Designing payments for environmental services in theory and practice: an overview of the issues	*Ecological Economics*, 65:4, 663–74.	IV	91
2008	T. A. Gardner, J. Barlow, I. S. Araujo, T. C. Avila-Pires, A. B. Bonaldo, J. E. Costa, M. C. Esposito, L. V. Ferreira, J. Hawes, M. I. M. Hernandez, M. S. Hoogmoed, R. N. Leite, N. F. Lo-Man-Hung, J. R. Malcolm, M. B. Martins, L. A. M. Mestre, R. Miranda-Santos, W. L. Overal, L. Parry, S. L. Peters, M. A. Ribeiro, Jr, M. N. F. da Silva, C. da Silva Motta and C. A. Peres	The cost-effectiveness of biodiversity surveys in tropical forests	*Ecology Letters*, 11, 139–50.	I	16
2008	D. Kaimowitz	The prospects for reduced emissions from deforestation and degradation (REDD) in Mesoamerica	*International Forestry Review*, 10:3, 485–95.	IV	89
2008	J. Sayer, G. Bull and C. Elliott	Mediating forest transitions: "grand design" or "muddling through"?	*Conservation and Society*, 6:4, 320–7.	I	25

2009	B. Arts and M. Buizer	Forests, discourses, institutions: a discursive-institutional analysis of global forest governance	*Forest Policy and Economics*, 11, 340–47.	IV	77
2009	T. M. Brooks, S. J. Wright and D. Sheil	Evaluating the success of conservation actions in safeguarding tropical forest biodiversity	*Conservation Biology*, 23:6, 1448–57.	I	23
2009	R. L. Chazdon, C. A. Peres, D. Dent, D. Sheil, A. E. Lugo, D. Lamb, N. E. Stork and S. E. Miller	The potential for species conservation in tropical secondary forests	*Conservation Biology*, 23:6, 1406–17.	I	10
2009	C. J. Clark, J. R. Poulsen, R. Malonga and P. W. Elkan, Jr.	Logging concessions can extend the conservation estate for Central African tropical forests	*Conservation Biology*, 23:5, 1281–93.	I	11
2009	R. DeFries, F. Rovero, P. Wright, J. Ahumada, S. Andelman, K. Brandon, J. Dempewolf, A. Hansen, J. Hewson and J. Liu	From plot to landscape scale: linking tropical biodiversity measurements across spatial scales	*Frontiers in Ecology and the Environment*, 8, 153–60.	I	18
2009	D. B. Lindenmayer	Forest wildlife management and conservation	*Annals of the New York Academy of Sciences*, 1162, 284–310.	I	1
2009	A. E. Lugo	The emerging era of novel tropical forests	*Biotropica*, 41:5, 589–91.	I	15
2009	A. D. Manning, P. Gibbons and D. B. Lindenmayer	Scattered trees: a complementary strategy for facilitating adaptive responses to climate change in modified landscapes?	*Journal of Applied Ecology*, 46, 915–19.	I	9
2009	D. Sheil and D. Murdiyarso	How forests attract rain: an examination of a new hypothesis	*Bioscience*, 59:4, 341–47.	I	24
2010	E. Meidinger	Forest certification and democracy	*European Journal of Forest Research*, 130, 407–19.	IV	86
2010	R. B. Norgaard	Ecosystem services: from eye-opening metaphor to complexity blinder	*Ecological Economics*, 69, 1219–27.	IV	92

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Date	*Author*	*Title*	*Source*	*Vol.*	*Ch.*
2010	J. Rayner, H. Hoogeveen, K. McNutt, P. Verkooijen and C. Wildburger	Conclusions from *Embracing Complexity: Meeting the Challenges of International Forest Governance: A Global Assessment Report*	A. Buck and P. Katila (eds), *Embracing Complexity: Meeting the Challenges of International Forest Governance.* A Global Assessment Report Prepared by the Global Forest Expert Panel on the International Forest Regime, Vienna: IUFRO World Series, 28, pp. 137–45.	IV	71
2010	K. A. Wilson, E. Meijaard, S. Drummond, H. S. Grantham, L. Boitani, G. Catullo, L. Christie, R. Dennis, I. Dutton, A. Falcucci, L. Maiorano, H. P. Possingham, C. Rondinini, W. R. Turner, O. Venter and M. Watts	Conserving biodiversity in production landscapes	*Ecological Applications*, 20:6, 1721–32.	I	26
2011	Y. Malhi, C. Doughty and D. Galbraith	The allocation of ecosystem net primary productivity in tropical forests	*Philosophical Transactions of the Royal Society* B, 366, 3225–45.	II	30
2012	B. Arts	Forests policy analysis and theory use: overview and trends	*Forest Policy and Economics*, 16, 7–13.	IV	80
2012	G. Broekhoven, S. Von Scheliha, M. Shannon and H. Savenije	Moving forward with forest governance: a synthesis	*European Tropical Forest Research Network News*, 53, vii–xv.	IV	74
2012	W. Mojeremane, R. M. Rees and M. Mencuccini	The effects of site preparation practices on carbon dioxide, methane and nitrous oxide fluxes from a peaty gley soil	*Forestry*, 85:1, 1–15.	II	46