

BOOK REVIEWS

The Political Economy of Environmental Taxes

BY NICHOLAS WALLART

ix + 213 pp., 24 × 16 × 2.5 cm, ISBN 1 84064 185 1 hardback, GB£ 49.95, Cheltenham, UK: Edward Elgar Publishing, 1999

For many years environmental economists have generally tended to the opinion that, for a wide variety of environmental problems, the most efficient means of attaining environmental improvement is through environmental taxation. Over the last 10 years, in some northern European countries at least, environmental policy makers seem to have begun to take them seriously, and a broad range of environmental taxes has started to be introduced. However, the process of introduction has been slow, fitful and not without political fall-out, as shown by the protests against the taxation of road fuels which swept across Europe in September 2000. This book not only sets out the rationale for and nature of environmental taxation, it also investigates the difficult issues of who wins and who loses from the application of this policy instrument, thereby giving insights into how that application may be made politically acceptable. A slightly unfortunate feature of the book, which suggests that it has been long in production, is that there are very few references from 1996 and none from later years, so that it reflects none of the rich experience of environmental taxes in the mid to late 1990s. This is less problematic than it might be, because the empirical content of the book is slight, and the theory and principles on which it concentrates have retained their relevance.

The first part of the book introduces different approaches to environmental policy and compares the different types of policy instrument. There is little here that would not be found in any standard textbook on the subject, but the treatment of the material is clear and direct, making it very suitable for undergraduate courses in environmental economics or policy.

The second part goes more deeply into environmental taxation, setting out the standard Pigouvian analysis, and contrasting this with the charges-and-standards approach. While the former tends to dominate textbook treatments of this issue, the latter is far more often used in practice. In fact, there is currently no example in Europe of an environmental tax set using Pigouvian criteria (the tax rate equals the marginal cost of the environmental damage at the optimal level of damage). Wallart cogently explains why this is so. Firstly, the Pigouvian tax rate is often difficult or impossible to calculate. Secondly, in the absence of knowledge of the environmental optimum, environmental policy tends to proceed by making progress towards specified targets, which fits well with the practice of introducing a tax and then varying (normally raising) its rate in order to achieve the desired environmental effect.

A strong point of Wallart's analysis is that he never fails to consider, in his discussion of the relative effects of different environmental taxes, the use of the revenues from the taxes. At one point (pp.81ff.) he sets out in a particularly insightful way how low-rate and therefore low-incentive environmental taxes, the revenues from which are spent on achieving specified environmental objectives, can approximate classic Pigouvian incentive taxation, which normally requires high rates to be effective. The former kind of environmental taxes involves a far lower overall tax take by the

government, which is another reason for their greater political acceptability, which in turn explains why they have been more widely introduced.

Such analysis acts as a curtain raiser for the major part of the book, which looks in depth at the issue of what makes environmental taxes acceptable or unacceptable. One reason for opposition to environmental taxes is that they can be perceived as immorally granting a licence to pollute, or trying to put a price on nature. Wallart makes some suggestions as to how this problem may be mitigated by taking care over the formulation and presentation of the measure.

More important is the opposition to environmental taxes that comes from the groups who stand to lose out from them, particularly the most affected economic sectors. A common feature of environmental taxes in Europe is exemptions, or the application of reduced tax rates, for such sectors. Exemptions or reduced tax rates undermine the efficiency of an environmental tax regime, in a way that refunds to the opposing groups (on a different basis to that on which the tax was paid) do not. Not surprisingly, Wallart finds that 'an appropriate use of the tax revenues is probably the most essential feature for the acceptance or rejection of an environmental tax' (p. 133).

However, as Wallart shows in some of the most complex analysis in the book, there is no single 'appropriate' use of the tax revenues. While broadly he considers an ecological tax reform (use of the revenues to reduce other taxes) to be 'the most attractive solution' (p. 192), yet 'there is no general recipe or formula for environmental taxes' (p. 189). Each introduction of environmental taxes has to be approached and implemented in the light of the specific conditions related to it. On each occasion the path to the statute book is likely to be over rough political terrain, but the prize can be environmental protection that is both efficient and effective. This book identifies those routes that promise to be least politically difficult, and points out the pitfalls and potential dangers in implementing environmental taxes, in a way that is useful to students and policy makers alike.

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The View from Bald Hill. Thirty Years in an Arizona Grassland

BY CARL E. BOCK AND JANE H. BOCK

xxiv + 197 pp., 23.5 × 15.5 × 1.5 cm, ISBN 0 520 221842 paperback, US\$ 16.95, Berkeley and Los Angeles, USA: The University of California Press, 2000

This is the story of a large-scale experiment. In 1968 an otherwise typical area of arid grassland in the Sonora Valley of southern

Arizona had all cattle removed over an area of 31565 ha of what came to be the Appleton–Whittel Research Ranch, now managed by the Audubon Society. This book is an account of the results of the work done since 1974 by the Bocks and their collaborators to interpret the patterns of changes since the cattle were removed. The main body of the text is written in widely accessible vocabulary. Each chapter is accompanied by notes on the science of the chapter, and there is an extensive bibliography.

The main text covers most of the physical and biological aspects of the Ranch and adjoining rangelands, but never in a dry didactic way, and often with some thought-provoking personal reflection, which avoids cheap sentimentality. Even the section on climate is brought to life by personal perspectives of how seasonal change of climate reflects upon life in the Bock household, and there are engaging pen pictures of their ranching neighbours and scientific collaborators. There is also a good deal of well chosen but simple tabular and graphical material, and the species studied to illustrate key ecological processes are brought to life as tangible ecological entities. In its totality the book is an excellent field sketch of the area for the naturalist as well as the ecologist.

The main subject of the research reported is, of course, the effect since cattle were removed, and studies on this timescale are badly needed. The conclusions they come to about this issue, which is at the heart of the conflict in North America between ranchers and environmentalists, just as in the UK we have concerns about the effects of over-grazing in the uplands, are balanced and reasoned. They find the balance of effects of grazing cannot be seen simply; some species do well and others do badly when grazing is removed. They advocate sensitive tailoring of management to meet local conditions, given the diversity of grassland types that are managed as rangelands in the USA.

Grazing is, however, only one of the subjects of study. The effects of burning, predator control, habitat fragmentation, nest site availability to birds, the impacts of alien plant species, are also investigated, in some cases with curious results. The Authors reflect upon the change being caused in Arizona by urbanization, which is less well understood, but may have done far more tangible damage in a few decades than cattle ranching has done in more than a century. I was interested by the way in which the thinking about experimental design was explored throughout the main text. It is a rare talent to be able to bring this subject to life and I was particularly taken by the concern that experimentation should only touch lightly upon the long-term ecological development of Sonoita Valley.

I am curious as to how two authors, even when married, can produce such a stylistically seamless text. This is an excellent piece of writing, which will appeal to a wide audience with environmental interests. It will be particularly interesting to rangeland ecologists, range managers, agronomists and agricultural policy-makers in many parts of the world, not just the arid zones. Visitors to the arid grassland of Arizona will find it an engaging, serendipitous introduction to the biome.

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Managing the Environmental Crisis. Incorporating Competing Values in Natural Resource Administration. Second edition

BY WILLIAM R. MANGUN AND DANIEL H. HENNING

xxviii + 394 pp., 23.5 × 15 × 3 cm, ISBN 0 8223 2413 X paperback, GB£ 14.95, Durham, USA: Duke University Press, 2000

Environmental administrations in many countries are the result of a trial and error process. In industrialized countries they are the outcome of a complex evolution. A move from a curative model, in which environmental damage is restored, to a prevention model, in which standards and other instruments allow for the preservation of the quality of the environment, and finally towards a precautionary attitude based upon uncertainty, necessitates different capacities. Where in the beginning merely engineers managed environmental policy, they were gradually complemented and replaced by biologists, lawyers, economists, communication specialists and risk managers. Parallel to this evolution is the important extension of the environmental policy arena and its implementation during the last three decades. Moreover this extension is accompanied by changes in scale of authority management. They are subject to both decentralization and more responsibilities for authorities at local and middle management levels, and the emergence of an international corps of environmental diplomats since the 1980s. This context provides the basis for understanding patterns and structures in current environmental administrations.

Managing the Environmental Crisis describes, analyses and explains natural resource administration in the USA. It provides a broad overview of this administration in its conceptual and multidisciplinary aspects. Aside from an introduction in which the 'forces shaping the environmental and natural resource administration' are defined, and the basics of environmental decision-making are described, the book looks into the policies and their implementation in a wide array of sectors. These entail: energy, renewable and non-renewable resources, outdoor recreation and wilderness, pollution, and urban and regional policies. The last chapter deals with selected aspects of the international environmental administration. Although the analysis concerns the situation in the USA, readers from other countries might be interested in the manifold links and relationships with the international environmental scene.

The strengths of this book are its capacity to provide a systematic overview and to provide keys for understanding the broad and complex pattern of relationships between policy and administration. In this it is more than just descriptive; in a readable and accessible way the Authors unravel the mechanisms driving the organization of the environmental administration in the USA. They pay particular attention to the role of target groups such the media, economic pressure groups, the environmental movement and the public at large.

In spite of its 394 pages of text, the book does not offer a real in-depth discussion of the different domains in the environmental administration. Nor is it strong in analysing new trends as coping with globalization or uncertainty.

The book is written in a clear and direct style, which is easy to read. The readability is further enhanced by the lack of figures. Only one table is included. The result is that the reader gets a feeling of transparency in a complex and diffuse subject matter. Most of the bibliographic references date from the 1980s. They mainly refer to the content of the first edition that was published in 1989. Among the annexes, a most useful glossary is included.

This book is well suited as a basic introductory text on environmental policy and administration. Consequently it is a very useful

book for students in environmental sciences and a broader interested audience in particular in the USA. Abroad all those who are interested in the USA environmental administration model will read it with pleasure. It entails a wealth of interesting short stories such as those dealing with the question of how less than six per cent of the world's population uses a quarter of the annual amount of energy consumed worldwide (pp. 95–96).

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The Environmental Dimensions of Islam

BY MAWIL IZZI DIEN

191 pp., 24 × 16 × 2 cm, ISBN 0 7188 2960 3 hardback,
 GB£ 30.00, Cambridge, UK: The Lutterworth Press, 2000

Finally, a book on Islam and the environment has been published in the English language, and it is a good one. Years of neglect by Muslim and other scholars to elucidate the importance of good environmental conduct in one of the major religions of the world has left a gaping hole in literature which will take years to fill. The work of Izzi Dien is a welcome step in the right direction.

There is no question that Islam is a highly, but not uniquely, environmentally friendly faith. The book makes this point abundantly clear and on this account alone the author must be congratulated for his contribution.

The book is organized in nine chapters, including an introduction and a short conclusion. The early chapters explain that in Islamic thought the environment matters a lot. There is nothing in the Koran that may give an impression to the faithful that nature is a mere object to be ruthlessly exploited. The author is quite correct to point out that many Muslim nations, contrary to Islamic teaching, are rapidly 'developing' without an in-built cultural awareness of the environment. Unfortunately, a lifestyle based on conspicuous and wasteful consumption is already common in many Muslim countries, especially in well-to-do ones.

The book quickly gets to an important point that like other monotheist religions Islam is anthropocentric in orientation, but it rejects the paradigm of dominance of the earth and its creatures by human beings. High regard for nature is evident in almost all Islamic rituals, which are in harmony with environmental elements. For example, the daily supplications are timed according to the earth's planetary movements. Rituals of pilgrimage and fasting are timed according to the lunar year, which moves seasons from year to year, drawing the faithful's attention to the natural order.

There is a similarity between Islam and Judaeo-Christian faith regarding the stewardship doctrine. The theme of trusteeship in Islam is well captured by the argument on p. 109: 'The whole universe is seen by Islam to be united by one purpose, which underlines everything that exists. That purpose unites human beings with the earth, water and vegetation, indicating that these are the basic inseparable ingredients of life of which human beings are privileged to be trustees, and that they should carry out this function in a responsible, respectful, charitable manner.'

In Chapter four, 'Towards Islamic environmental ethics', the Author contends that in an anthropocentric faith like Islam the concept of conservation makes sense if it relates to life, especially the human life. Often, this relationship between conservation and human life is obvious, but sometimes this may not be so. For example, inspired by the Koran, Izzi Dien argues that the skies are the canopy of human beings. In this respect, the damage to the ozone layer is, in fact, damage to life on earth and thus must be a sin.

Not everybody would agree with the sentiments expressed in Chapter 5, 'Islamic legal perspective on the environment', about the *Sharia* which the author correctly describes as a body of Islamic law inspired by the Koran, the Prophet's hadiths (teachings) and other 'approved' sources. It is true that *Sharia*, in one form or another, is the aspiration of some but not all Muslims. In parts of the Muslim world, especially the region influenced by Turkey, which stretches from Bihac, deep in Europe, to China, secularism rather than the *Sharia* appears to be the peoples' choice. Izzi Dien mainly expresses the viewpoint that is prevalent in the Arab world about how Muslims should live. This chapter gives me the impression that embracing the *Sharia* would be good for the environment, with which I strongly disagree.

There are worrying cases of environmental wrong-doing in some countries ruled by the *Sharia*. For example, in the Kingdom of Saudi Arabia, the government has been encouraging large-scale wheat production in the desert by the use of precious ground water. This is not only destroying the nation's groundwater stocks, but also denying other countries a fair share in the world wheat market. As former professor at the King Abdul Aziz University, Jeddah, and consultant to the Saudi Arabian Centre for Science and Technology on land use, the Author must be aware of this problem, but it is not highlighted in his book; he mentions the environmental vandalism carried out by Saddam Hussain at the end of the Gulf War, but not environmental mismanagement by King Fahad.

Since this is the first text on the subject that I have encountered in English, I would like to point out a number of important issues which are not discussed in the book. There are some extremely disturbing problems in the Muslim world, one of which is the appalling treatment of women by the fundamentalist regimes. A typical fundamentalist sees a woman as devil incarnate whose aim is to corrupt men and society. What an insult to more than half of the human race! In this respect, the fundamentalist does everything to block her mind, shut her mouth, cover her head (sometimes the whole body from head to toe) and lock her up in the house away from the public eye. We see the extreme manifestation of this attitude in the Taliban's Afghanistan. In other countries ruled by the *Sharia*, the situation is only slightly better. In fundamentalist regimes women are excluded from the social decision-making process as much as possible. What do female rights have to do with the environment? The answer is a lot. In western societies women as housekeepers and single consumers are at the cutting edge of decision-making in the market-place. A substantial proportion of females, especially the educated ones, do not purchase items that are produced in an environmentally unfriendly way or are directly harmful to the environment. Do Muslim women have this type of discretion in a *Sharia* regime?

Peoples' desire for democracy has been relentlessly suppressed in a large part of the Muslim world either by fundamentalist regimes or military dictatorships. In effect, fundamentalist Islamic groups seem to be making most of the headlines about Muslim affairs and

in the process bringing the good name of Islam into disrepute. Democracy, not 'Islamic democracy', or peoples' democracy, but the pluralist and secular democracy, is absolutely vital for the well-being of human beings as well as for the protection of the environment. Only in democracies are social and environmental problems brought out into the open. A recent example may be helpful. In Turkey, a secular and pluralist democracy where more than 95% of people are Muslim, special interest groups have been pressing very hard for rejection of nuclear power during the last decade or so. Fortunately, this issue has been openly debated in the country and as a result the Turkish Premier, Mr Ecevit, under public pressure shelved the nuclear proposal indefinitely. This, I believe, is a triumph of democracy in a Muslim country. Has there been an open public debate about nuclear power in the Islamic Republic of Iran? Has there been an open public debate about large-scale wheat production in the deserts of the Kingdom of Saudi Arabia?

Today, the real division in Islam is not between Sunni and Shia persuasions but between the Sharia and secularism. For example, in Shia Azarbeycan, secularism is in force, but in neighbouring Shia Iran, where a large section of the population is Azeri, Sharia is the rule. It has been argued that Sharia regimes offer nothing but oppression to the faithful and damage to the environment and thus they must be unislamic. Beyaz (1999, 2000) contends that only a very small part of the Sharia is influenced by the Koran. Sharia in the main is driven by fictitious hadiths and ancient Bedouin tradition which has no place in a modern Muslim society. The last thing a Muslim needs is the Sharia with all its state machinery (often oppressive) between himself/herself and god. Only in pluralist and secular democracies will Muslims be free to worship god in the manner that they feel appropriate. These are important issues in the Muslim world but are not explored in the book. Also, the pressure of the rapidly-growing Muslim population on the world's ecosystems and different viewpoints about abortion do not receive sufficient attention in the text.

However, the reader should not think that the lack of emphasis on these issues undermines the value of Izzu Dien's work, which is high. To be fair, in a book of 191 pages it is not possible to discuss all the environmental dimensions of Islam and problems of Muslim societies. I am sure that the challenge will be taken up in due course. As a first step, Izzu Dien does excellent work in making it clear to the English-speaking world that Islam, in its purest form, cares a lot for the environment.

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Protecting Ontario's Wilderness. A History of Changing Ideas and Preservation Policies, 1927–1973

BY GEORGE M. WARECKI

ix + 334 pp., 4 maps, 23.5 × 15.8 × 2 cm, ISBN 0 8204 2215 0
 hardback, US\$ 55.95, New York, USA: Peter Lang Publishing, 2000

This book is based on the author's doctoral thesis, and is written very much from an historical viewpoint. It details, in a blow-by-blow account of immense detail, the issues that surfaced in the mid-twentieth century surrounding the two protected areas of Quetico-Superior and Algonquin in the Canadian province of Ontario. A substantial Introduction explores the ideas of 'wilderness' held by the different interested parties for much of this period, noting especially the incorporation of aboriginal people and the wider public into this movement in the later years. Part 1 of the book is subtitled 'The era of quiet diplomacy'. Chapter 1 explores the attempts to protect the trans-border wilderness of Quetico-Superior, embracing the Quetico Provincial Park in Ontario, Canada, and the Boundary Waters Canoe Area of the Superior National Forest in Minnesota, USA. The difficult task of the joint Quetico-Superior Council, and its successors, in balancing conflicting demands on this large wilderness area is described as an era of 'quiet diplomacy' until 1960. Chapter 2 recounts the emergence of non-governmental organizations (NGOs) in Ontario concerned with wilderness for its own sake. Bodies such as the Federation of Ontario Naturalists (est. 1931) and the Nature Conservancy of Canada (est. 1963) stressed the sanctuary or nature reserve function of wilderness. Part 2 of the book is subtitled 'The environmental era'. In an Introduction to it, the author notes the revolutionary changes in attitudes and political approaches to conservation in North America during the 1960s and early 1970s. Chapter 3 records how this gave birth to new NGOs, for example the National and Provincial Parks Association of Canada (est. 1963) and the Canadian Nature Federation (est. 1971). Chapter 4 discusses the evolution of provincial park policy 1965–1967 in the Ontario Government Department of Lands and Forests. Chapter 5 introduces the battles that arose in the late 1960s when the Algonquin Wildlands League (est. 1968) attempted to protect the Algonquin Provincial Park (est. 1893) from a series of threats. Chapter 6 notes the evolution of a wilderness philosophy within the Algonquin Wildlands League and the master plans for provincial parks drawn up by the Department of Lands and Forests. A definition of wilderness by the League excludes all human activity from such areas, including aboriginal peoples. Chapter 7 covers the public hearings and written submissions to the Provisional Master Plan for Algonquin (Department of Lands and Forests 1968), culminating in the Algonquin Provincial Park Master Plan (Ministry of Natural Resources 1974). The final compromise is described as 'average man's (sic!) wilderness', which whilst not satisfying the purists of the League, was a distinct improvement on previously *ad hoc* management. The final two chapters return to Quetico Provincial Park and describe the struggles between the Algonquin Wildlands League and the Ontario Government which resulted in a ban on logging in the Park in 1971, and the Park being classed as a 'primitive class park' in 1973. The Conclusion emphasizes the importance of biography and personal relations in the development of conservationist thought in Ontario, and stresses the great effect of the land on Ontario's political and intellectual development.

The scholarship and dedication that has gone into researching this book cannot be questioned. Copious endnotes for each chapter

give full references and background details, and there is a useful note on sources at the end of the book. A very necessary list of abbreviations is presented, and there is a helpful index. However, in terms of critical understanding, the book does 'lose the wood for the trees'. This is always a danger when a doctorate thesis is published, and to give context to the detailed events in Ontario, readers from outside North America would benefit from having more synoptic material on the environmental movement in North America during the 1960s and 1970s. One disappointment is the poor standard of the four maps in the book; these are all cramped in layout, and suffer from a lack of clarity. Three of the maps have no scales, and one has no key to explain its contents. For the reader who has no first-hand experience of the parks discussed, this is a serious deficiency. Overall this is an important account of events over the middle years of the century in Ontario in the field of nature conservation. However, the high price of the book, together with its narrow focus, means that it is mainly destined for the shelves of university libraries, rather than being purchased by the average student or the general public.

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Air Pollution and the Forests of Developing and Rapidly Industrializing Countries. Report No. 4 of IUFRO Task Force on Environmental Change

EDITED BY J.L. INNES AND A.H. HARON

ix + 262 pp., 24 × 16 × 1.5 cm, ISBN 0 85199 481 4 hardback, GB£ 49.95, Wallingford, UK: CABI Publishing (in association with IUFRO), 2000

Any citizen of a resource-rich country is entitled to feel uneasy on reading this book, which describes the dilemmas of developing and rapidly industrializing countries in relation to the use and maintenance of forest resources. Two themes that run through this book are of immediate and practical concern for the citizens of developing countries, namely the effects of pollution on forests, and forests as sources of pollution. Throughout the world, concerns for human health generally take precedence over those for environmental health, but the provision of food may be an even more urgent imperative than the maintenance of health in many countries where forests are under the greatest threat. Therefore, it is important that citizens of developed nations should be aware of the constraints under which developing countries operate, including the economic strictures that are sometimes imposed by experts from the developed countries.

The first two chapters provide a very useful summary of classes of pollution threat in developing countries. Point sources of

pollution that result in injury due to sulphur dioxide occur in several regions, whilst diffuse sources of pollution associated with ozone formation have been documented in China and different parts of Africa. Urban air pollution is chronic in some of the largest cities, due to both domestic fires and transport. Indoor burning of solid fuels is a forest-related cause of pollution that is increasingly recognized to have serious health effects. Forest fires and their resulting smoke plumes achieved prominence during 1997, 1998 and 1999 in Indonesia and Malaysia. The health effects of these fires are associated with fine particulate matter, and there is increasing attention being paid to the importance of the finest sizes (particles less than 2.5 µm diameter) that penetrate to the regions of human lungs that are involved directly in oxygen exchange.

In contrast, the attention that has been devoted to the effects of air pollution on forests in developing countries has been rather limited. The editors draw attention to the paucity of genetic or ecological studies in forests of these countries. This lack of attention is understandable in view of the imperatives faced by governments that must be the principal sources of research funds. It is unconvincing for forest researchers to argue for long-term ecological studies when medical practitioners can point to large numbers of unhealthy or impoverished children whose most immediate needs are food and clean water. Despite this pragmatic position, we need to investigate the effects of pollutants on forests in developing and rapidly industrializing countries, so that the often slow changes that occur in forest ecosystems can be recognized and corrected before they become irreversible.

To provide perspectives of pollution effects, 16 authors have provided situation reports for Mexico and Central America, Latin America, Africa, Central Asia, China and Korea, South-east Asia and India. These reports vary in their structure and detail according to the problems, and they provide a varied but coherent account of the critical issues in each region. It is salutary to recognize that pollution problems in forests are not limited to a simple set of causes and effects.

In Central America, the major pollution concern is associated with ozone pollution from Mexico City, which has caused forest decline in the surrounding areas. One of the factors causing concern in Latin America is the projected increase in emissions of sulphur due to industrialization, and increased ozone concentrations as cities continue to expand. These projected increases could be reversed if suitable technology was applied to industries, or if the potential for hydroelectric development was exploited. In Brazil, biomass burning accounts not only for the clearing of forests, but also for substantial atmospheric pollution and it contributes to the acidification of soils.

Industrial development in Africa has been relatively slow and scattered, and air pollution problems are linked to a few localized mineral-processing operations. While these activities are of a large scale and produce local concentrations of sulphur in the environment equivalent to those in northern Europe, they are widely separated and do not constitute regional air pollution problems. Of more concern is the desire in almost all African countries to enhance industrial and economic activity, and to achieve this by offering access to cheap energy resources and sometimes a relaxed approach to environmental regulation.

Parts of the Russian Federation exhibit air pollution effects on forests, but recent reductions in industrial activity have seen emissions decrease. However, the declining economic status of these regions has meant that there are fewer funds for forest management and restoration. Russia also contains 3 Mha of forest that has been

contaminated by radionuclides released from weapons testing. The scale of forest burning in Siberia is enormous, with an estimated 5 Mha being affected annually. Issues of concern for forests in China are acidic deposition, particularly in the south of the country, where the soils are already acidic. The reductions in forest growth due to acidic precipitation have been estimated to be 50% in some areas. South-east Asia does not have extensive industrial development, but air pollution resulting from forest burning has been a major environmental concern for several years. Acute interest has been focused on human health implications, but there is very little information on the effects of air pollutants (smoke and oxidants) on the forests themselves. A well-researched example of air pollution effects from India is particularly cogent. Forest ecosystem structure and diversity were examined up to 11 km from an aluminium smelter, at which point the annual average concentration of fluoride in the air was $0.44 \mu\text{g m}^{-3}$, a value just below the generally acceptable level for the perimeter of an industrial buffer zone in many industrialized countries. Closer to the smelter, decreased diversity was associated with gross pollution, the annual average concentration of fluoride in the air ($3.7 \mu\text{g m}^{-3}$) being equal to the maximum 24-hour concentration permitted in many jurisdictions.

Wood fuels are important energy sources in many countries, and they are burnt in inefficient stoves, releasing a range of pollutants that have serious health effects. Some remedies are simple, such as better ventilation, but in cold climates heat is at a premium, and ventilation is reduced. Forest fires are examined as sources of pollutants, both the greenhouse gases carbon dioxide and methane, and smoke. The atmospheric changes resulting from large-scale fires may be enduring as well as extensive. For example, the costs of the Indonesian fires of 1997–1998 were estimated to be \$US 4.5 billion, of which human health costs and forest-related costs each contributed about one-third of the total.

In a final section, regional policy processes for air pollution in Asia, Africa and Latin America are discussed, and the Editors conclude with a concise and challenging summary of the situation and of the tasks ahead, particularly the interdependence of scientific, technological and social advances in the solution of air pollution problems in the world's most populous regions.

Production of the book has been attended to with commendable care. It is easily readable, with clear maps and half-tone photographs. The text is free from errors, and reveals attention to detail in terms of the correctness of species names (e.g. p. 3). Coverage of material is extensive and current and is supported by a comprehensive index.

This apparent catalogue of gloom is not intended to depress the reader, but to provoke questions concerning the relationships between forest conditions and the human condition, between economic and moral perspectives, and between human and ecological values. The book deserves to be read in all its parts by administrators as well as by forest scientists, analysed, and used as a platform for further inquiry and action.

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Hunting for Sustainability in Tropical Forests

EDITED BY JOHN G. ROBINSON AND ELIZABETH L. BENNETT

xxi + 582 pp., 25.5 × 18 × 3.2 cm, ISBN 0 231 10977 6 paperback, US\$ 29.50, New York, USA: Columbia University Press, 2000

When I began reading this book, I thought, 'How much could there be to say about hunting in tropical forests? Inevitably, hunting will be found to be unsustainable'. How wrong I was. Although the common conclusion reached in the 22 case studies presented here is indeed one of unsustainable wildlife harvests, this book presents a wealth of field data and case-specific nuance that I believe could form the foundation of conservation strategy for tropical forests during the next decade or more.

The authors ask whether wildlife is being hunted sustainably by local people in various tropical forests and then identify factors that influence harvest intensities in each case. Each case study chapter follows a format which includes description of the physical, biological and human social characteristics of the forest area, methods for measuring wildlife densities and assessing hunting pressure, impacts of hunting on wildlife populations and human societies, and discussion of factors that influence hunting by local peoples. Although some chapters present more convincing data than others and the line-transect method used in all studies to census wildlife populations is not always statistically rigorous, the combined results of these two dozen long-term studies from Africa, South-east Asia and the neotropics leave little doubt that most species of game mammals, especially those with low reproductive rates like primates and certain of the ungulates, are overhunted wherever there are people living in or near tropical forests. Overhunting results from various combinations of factors, especially: markets for bushmeat, high human densities, limited forest area, increased access provided by logging, and technology such as wire snares, guns and lights.

I found the broad regional differences revealed in this book to be instructive. Central Africa and South America still contain large blocks of forest, whereas inaccessible forest is becoming very rare in South-east Asia. Local populations subsist nutritionally to a lesser degree on wildlife in South-east Asia than in either Africa or the neotropics. Markets for bushmeat are a potent driver of widespread over-hunting in African forests where they are often the only source of cash for local communities, whereas in South-east Asia bushmeat sale is of variable importance, and in South America bushmeat markets do not figure greatly in hunting at all, perhaps because the Amazon has been cleared largely for ranching and most frontier communities have access to beef. Cable snares, which kill indiscriminately, and, to a small degree guns, are the principal hunting technologies used in Africa, whereas guns, snares and traps kill most wild animals in South-east Asia. In South America, guns predominate; why are snares not used in South America? Ungulates and primates constitute most of the game killed in all forests but there is considerable variability among ungulate species in the resilience of their populations to hunting. The Xavante Indians of Brazil stand out as the only group that prefers, even over peccary and tapir, to eat an edentate: the giant anteater.

However, the striking contribution of this book is the clear conclusion reached by all authors working in all regions that protected source areas have to form the basis for conservation and sustainable harvest of wildlife populations in tropical forests. In large forest blocks especially in Africa and South America, remote areas appear to act as sources for wildlife populations that are being

over-hunted in the vicinity of human settlements. This is where things get really interesting. Based on much of the field information presented in this book, conservationists should be able to begin formulating feasible, site-specific plans for conserving wildlife in conjunction with providing alternatives for local peoples who often depend on this resource for sustenance. Negotiating alternatives for local people in exchange for forfeiting hunting opportunities in protected wildlife source areas is neither a trivial nor an insurmountable task. Some authors make a good stab at solutions here and the importance of long-term involvement by outside agencies to provide economic alternatives and support local peoples rights for self-determination is stressed. However, I believe the greatest value of this book is to lay a solid and irrefutable foundation for the next steps. The next steps are (1) to determine how large source areas have to be to maintain viable populations of vulnerable wildlife that will probably be overhunted outside the source area, and (2) to benefit local people from the total protection of source areas, and thereby make them allies of conservation. Some may feel this last step is unattainable, but it is not. Increasingly, NGOs are learning how to collaborate with local communities to achieve conservation, and examples of success are beginning to emerge. Robinson and Bennett have produced a cohesive volume, packed with important information and with excellent introductory and concluding synthesis chapters. So, if you are interested in conservation of tropical forests, read this book and take heart.

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Land Use, Land Use Change, and Forestry: Special Report of the Intergovernmental Panel on Climate Change

EDITED BY ROBERT T. WATSON, IAN R. NOBLE, BERT BOLIN, N.H. RAVINDRANATH, DAVID J. VERARDO AND DAVID J. DOKKEN

ix + 377 pp., 28 × 21 × 1.5 cm, ISBN 0 521 80495 7 paperback, GB£ 18.95/US\$ 29.95, Cambridge, UK: Cambridge University Press, 2000

This book examines the global carbon cycle and explores alternative policies to manage the carbon cycle in order to reduce atmospheric carbon. The Kyoto Protocol specifically allows countries to count carbon sequestration activities but it does not specify what activities count, how they will be counted, and how any rules will be enforced. This book is intended to inform current negotiations.

The basic premise of the book is that there is a trade-off between a carbon accounting system that is accurate and a system that is practical. An accurate accounting system will keep track of all terrestrial carbon within a country and reward increases and debit declines. In practice, the Kyoto Protocol only recognizes changes in terrestrial carbon that are due to man-made activities. The agreement does not discuss charging or crediting countries for natural fluctuations in carbon. The carbon accounting system consequently has to isolate man-made causes from natural causes. A practical

system must also be universal, verifiable, enforceable, and inexpensive to implement. The system should also create desirable incentives to set aside carbon and so it must be concerned with leakage and cost effectiveness. The book addresses many of these issues in detail and thus serves as an important reference to people interested in climate change policy and specifically in carbon sequestration.

One important issue concerns the definition of a forest. If forests are defined as biomes with more than a minimum of cover, the choice of the minimum defines which ecosystems and outcomes countries can manage for credits. For example, if the forest definition is based on a high minimum cover, then countries with open forests will not be eligible. However, countries with closed forest will have to work at keeping their stocking density high in order to count their forest land. If the forest definition sets a low minimum cover, countries with substantial open forests can participate. However, low minima allow countries with closed forests to engage in severe partial harvests without any penalties.

Another critical issue concerns timing. Changes in land use and land use management set in place a path of changing carbon. Should projects be rewarded for their instantaneous contribution or their cumulative contribution at some future time? How can these rules be established to create desired incentives? If projects are credited for benefits that will occur far into the future, how can the accounting system encourage countries to maintain the land use over time?

The book also examines the problem of baselines as the points of comparison for each project. Should the baseline be what would have happened in the absence of the explicit carbon project? What prevents countries from overstating how much carbon they would liquidate in the absence of a policy? Should the baseline instead just compare outcomes at the beginning versus the end of the project? What appears to be a mere technical issue grants or strips billions of dollars of credits to countries with extensive natural forests and soil carbon. The baseline also determines how effective projects appear. If the baseline determines that a forest would be stripped in the absence of a policy, all of the carbon in the existing forests can be credited, but if the baseline determines that the forest would remain untouched, only changes in the carbon of that forest would count.

The book also discusses the problem of leakage. If countries are given the right to define project areas narrowly, they can take credit for converting liquidated landscapes back into production. However, if the carbon accounting ignores what happens to the land outside the project, the entire process may vastly overstate what actually happens to the carbon budget as harvesting and deforestation is shifted to sites outside the official project that do not count.

Finally, the book reviews the 27 experimental projects that have been undertaken in 19 countries since 1988. The projects follow three themes: avoiding carbon emissions through land conservation, increasing carbon sequestration, and replacing fossil fuel energy with renewable energy. A serious problem with these projects is that there is no consistent methodology for counting carbon across the projects or counting cost effectiveness, the cost per unit of carbon stored. It is consequently difficult to draw general conclusions from the projects that have been completed.

Whereas the book makes important contributions to understanding the natural science issues behind the negotiations, the book does not address many of the critical social issues. For example, the book generally does not explain what difference alternative rules make to specific countries. Clearly, negotiators would be very interested in knowing which rules would result in billions of dollars

of property rights and savings for their countries. The book overlooks this important equity and distributional dimension.

The book does not delve into the economic problems with managing land use. The methods used to estimate the economic cost of sequestration are often inadequate because they fail to distinguish between experimental costs (hiring scientists) and actual implementation costs. Many studies in the literature also do a poor job of accounting for time. Because the greenhouse gas problem is itself dynamic, sequestration is also likely to be a dynamic program, with ever increasing amounts of carbon being captured. Further, using forests for sequestration means that the amount of carbon being captured will vary over time as trees mature. Current studies do a poor job of relating the cost of these programmes which might fall at the beginning and in intermittent moments to the amount of carbon being stored and lost over time. The economic standards in this literature need to be improved in order to get a clear sense of how effective these techniques really are.

The book does not address the problem of enforcement. Land use is currently primarily under the jurisdiction of local entities. In order to incorporate land use into a global strategy, we would have to create federal oversight of land use policies, which would be a serious problem for many countries. Further, the international community will have a serious problem enforcing desired global land use policies on nation states. International control of land use is a serious violation of national sovereignty. Will countries tolerate any mechanism that grants such control to international bodies?

In conclusion, practitioners interested in climate change policy will surely find this book a useful reference. The Editors have identified a number of hurdles that must be overcome in order to design an effective carbon sequestration policy. The only drawback of the volume is that it does not deal with many of the social and economic problems as well.

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Guidelines for Marine Protected Areas

EDITED AND COORDINATED BY GRAEME KELLEHER
xxiv + 107 pp., 3 maps, 20.7 × 21 × 0.8 cm, ISBN 2 8317 0505 3
paperback, US\$ 24.75, Gland, Switzerland and Cambridge, UK:
IUCN, 1999

Protecting marine ecosystems and ensuring the sustainable exploitation of marine resources are the primary objectives of marine nature and resource managers today. Marine protected areas (MPAs), and specially networks of multiple use protected areas, are increasingly considered indispensable tools for achieving these objectives. For this reason a large number of MPAs have been established throughout the world in recent decades. However, MPAs are often created without explicit objectives or consideration to elementary criteria of suitability, feasibility and effectiveness. *Guidelines for Marine Protected Areas*, edited by Graeme Kelleher and published by the World Conservation Union (IUCN), aims at helping countries to establish systems of MPAs as key components of the integrated management of their coastal and marine ecosystems.

Guidelines sets out the actions needed to make an effective MPA, from the early planning stages to implementation. They replace guidelines published by IUCN in 1991 and are part of a set of documents on MPAs prepared by IUCN's World Commission on Protected Areas, namely, Kelleher *et al.* (1995) and a 1998 special issue of case studies of marine parks and their contributions to fisheries in *Parks* 8(2). *Guidelines* is addressed to natural resource managers, whether working on conservation of nature or on fisheries, but it should also be of interest to researchers involved in the design and monitoring of MPAs. The language used is very much that of policy makers and, thus, may turn some scientists off.

The book covers the main steps of designing, establishing and managing MPAs, each step being the subject of a separate chapter. All being essential, the most interesting contribution of *Guidelines* comes from the treatment of issues related to the distinctive characteristics of the oceans: their inter-connectivity and the public ownership of their resources. The high degree of linkage between land and the adjoining sea and the connectivity of the oceans dictate that MPAs be integrated into management policies of land use and use of the sea (Chapter 1). As a direct consequence of this, it is essential that planners of an MPA work with all the sectors of human activities affecting the coast and the sea, namely, tourism, fisheries, aquaculture, agriculture, forestry, industry, coastal development, defence and science (Chapter 3). Because making partnerships with local communities and this great diversity of stakeholders is central to the success of MPAs, *Guidelines* treats the question in detail (Chapter 4) and presents a collaborative management model to achieve this. In the marine environment, selecting sites for protection entails a different perspective to that of terrestrial protected areas (Chapter 5). In the ocean, the survival of a species is rarely linked to a specific site and thus broader objectives must be pursued. In addition, because in the marine environment effects of external factors, such as pollution or erosion, are likely to be insidious, special attention must be given to events outside the prospective MPA. *Guidelines* offers a set of rigorous criteria for site selection, which contemplate biogeographic, ecological, socio-economic, scientific, and feasibility considerations.

The main strength of *Guidelines for Marine Protected Areas* is that it is drawn from experience and as such contains little wishful thinking and a lot of ground-truth advice. This becomes especially clear in the treatment of management (Chapter 6) and of planning for financial sustainability (Chapter 7) of MPAs. Protected areas are more easily legally enacted than enforced and thus many MPAs are no more than 'paper MPAs'. Lack of sustained funding is a critical problem for MPA implementation and where governments are unable to provide it, managers need freedom to raise funds through user fees or donations. The last chapter calls for the need to include research and monitoring in the management process and to use their results to re-orient management. In one of the Annexes, *Guidelines* includes useful elements for a management plan.

In addition to the guidelines proper, the book distils interesting and relevant collective knowledge on experiences to date that is conveniently summarized in boxes inserted throughout the volume. Of the lessons learnt from previous experience, the Editor highlights both positive results – almost all MPAs contribute to the maintenance or restitution of biological diversity and abundance – and cautionary notes – local people and users must be involved from the start because more than biophysical ones, socio-economic considerations usually determine the success or failure of MPAs. Regarding the objectives and design of MPAs, relevant advice is also given. Opposition to recognition of fishery reserves as MPAs has

been counterproductive because today it is not possible to divorce the question of resource use and conservation. In addition, so long as the main goal is attained, it is recommended rather to have an MPA that is not ideal in wide ecological terms than to delay action in the name of creating the perfect MPA.

The book is printed in paperback, has a clear layout and the information is presented in an ordered and easy-to-follow manner. *Guidelines for Marine Protected Areas* is of wide applicability and should be read and followed by any planner or manager involved in the creation and implementation of MPAs. Unfortunately, administrative and political realities in some countries dictate that MPAs will continue to be created without regard to the criteria contained therein for years to come.

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Pricing the Planet: Economic Analyses for Sustainable Development

EDITED BY PETER H. MAY AND RONALDO SERÔA DA MOTTA

x + 220 pp., 22 × 14 × 1.5 cm, ISBN 0 231 10175 9 paperback, US\$ 20.00/GB£ 12.50, New York, USA: Columbia University Press, 2000

It is difficult to give a fair review in 2001 to a book copywritten in 1996, originally published in Portuguese in 1994, and based upon papers presented in 1992 during the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro. Much has been published in the meantime in the rapidly developing field of Ecological Economics, including Jansson *et al.* (1994), Krishnan *et al.* (1995), Costanza *et al.* (1997), Daily (1997), and the special section in the journal *Ecological Economics* on 'Valuation of Ecosystem Services' (Costanza 1998). Nevertheless, several chapters within *Pricing the Planet* are still useful.

I find that many of the recent books and articles dealing with Ecological Economics begin with an assumption that the reader already has a fair idea about the field. This limits the usefulness of these books for many beginning graduate students in Conservation Biology and Environmental Studies. In contrast, this book begins with a clear and basic introduction to the nature of the problem (failure of the market system to adequately price the services of nature) and how the field of Ecological Economics is attempting to remedy this problem. For this reason I intend to use the first chapter in *Pricing the Planet* (May's 'Sustainability: challenges to economic analysis and policy') to introduce beginning students in my Conservation class to the field of Ecological Economics.

Two other chapters of this book are interesting, in that they

reflect the international flavour that was present at the Rio conference. One, by Sergio Margulis, gives an estimate of environmental damage costs in Mexico, and a second, by Ronaldo da Motta and Ana Mendes calculates health costs associated with air pollution in Brazil. The other chapters certainly were relevant to the theme of the 1992 conference, but by now, there is much more recent and in-depth material available. These chapters include: 'Consumption patterns: the driving force of environmental stress', by J. Parikh; 'A tradable carbon entitlements approach to global warming policy', by A. Rose and B. Stevens; 'The role for economic incentives', by T. Tietenberg; 'Green accounting' by P. Bartelmus; 'Measuring sustainable income', by R. da Motta and P. May; and 'Carrying capacity' by H. Daly. There also is a chapter by R. Costanza, in which he summarizes his research agenda, although he has spelled this out in more detail in subsequent publications.

I was not aware that there had been a forum at the UNCED conference on ecological economics. It is nice to know this occurred.

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The Root Causes of Biodiversity Loss

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Politicians, planners and economists would really like there to be an institutional or common reason for biodiversity loss – a root cause. For example, grinding poverty can lead to short time-horizons and the unsustainable utilization of natural resources, because people must eat now and cannot wait. Or the inexorable quest for financial prosperity leads to exploitation of non-renewable natural resources and biodiversity-threatening pollution, because we must have development now and will absorb the costs in the future. If these are the root causes, then the way to deal with these problems is apparently relatively easy. If we alleviate poverty, then people will be able to afford sustainable exploitation, so biodiversity can be maintained in

productive landscapes. If we internalize costs from the impacts of development, then industry will seek a way to be profitable and conserve biodiversity in the process. In other words, if we can identify common underlying reasons for biodiversity loss and plan appropriately, then we can have a win-win situation: lots of biodiversity, no poverty and continued economic growth.

This book is about finding the root causes. It is the result of a project that originated in a dialogue between the World Wide Fund for Nature (WWF) Macroeconomics for Sustainable Development Program Office and the Global Environment Facility (GEF). The core of the book is ten case studies from a wide range of countries: Brazil, Cameroon, China, Europe, India, Mexico, Pakistan, Philippines, Tanzania and Vietnam. A variety of ecosystems are covered: rivers, woodlands, forests, mangroves and wetlands. Each case study has been prepared by a multi-disciplinary team, who have synthesized each topic into a coherent chapter which provides an introduction to each site and then considers the many faceted nature of the problem. The book is well structured, with the first section providing a framework, summaries of the case studies and main findings. The book is suitable for policy-makers, practitioners and as a source of material for undergraduate courses. It is an excellent general introduction to the multitude of reasons why we are losing plants, animals and habitats so rapidly.

Despite the book's claim that there are common patterns, definite conclusions on the root causes of biodiversity loss are however,

elusive. The nature of the problem is revealed in the chapter on recommendations: 'The simple truth is that the race to save biodiversity is being lost, and it is being lost because the factors contributing to its degradation are more complex and powerful than those forces working to protect it.' These are scary words, coming as they do from the World Wide Fund for Nature and the Global Environment Facility. Far from having a simple solution, this detailed investigation highlights the many and varied factors contributing to biodiversity loss that operate over a wide range of scales from local to international. Given that the problem is so complicated, we should perhaps not worry so much about what causes biodiversity loss, as to how biodiversity gets saved – let's call it the root causes of biodiversity conservation. This answer is a lot easier. Conservation works because of the dedication and perseverance of a small group of committed individuals who, often at considerable personal sacrifice, get out there and get on with the job. If the ultimate goal of this book is to prevent biodiversity loss, the WWF Macroeconomics Program Office could spend their time better by going out and lying down in front of a few bulldozers.

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