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Jyoti Parikh and Hemant Datye (eds), *Sustainable Management of Wetlands: Biodiversity and Beyond*, Sage, 2003, ISBN 0761996028

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In recent years management and economic analysis of environmental and natural resources have generated lots of interest among researchers in India. Much of the credit for this goes to programmes like Capacity 21 by the UNDP and Capacity Building in Environmental Economics by the World Bank, which have provided added momentum to this interest. This book, *Sustainable Management of Wetlands* edited by Jyoti Parikh and Hemant Datye, is the result of research done under the project Capacity 21. At a time when the debate on economic growth versus preservation of natural ecosystems like wetlands is quite alive in India, this book on various dimensions of wetland ecosystems is not only timely, but also extremely useful for decision makers and the research community at large.

The book has twelve chapters all written by acknowledged experts in the fields of the natural and social sciences and, as one would expect, it is mixed in its analytical and methodological approach. Some chapters would prove useful for decision makers whilst some would cover enough ground for an academic readership.

The first chapter by Y.K. Rao and Hemant Datye provides a general overview of Indian Wetlands. The authors discuss the spatial distribution of wetlands, its ecological functions, economic benefits, threat perception, assessment planning and management and economic valuation. They mention the threats to Indian wetlands due to information, market and intervention failures but the links between market failures and threats are missing and they do not succeed in providing the rationale for economic valuation of wetlands.

A second chapter by P.S. Roy and Mukund Dev Behera specifically deals with remote sensing tools, which have become a popular method for mapping and assessing temporal change in the size and distribution of wetland environments. The authors discuss the possible applications of

remote sensing for wetland mapping in India and illustrate this with the help of a case study of the Mainpuri and Etawah districts in Uttar Pradesh, where a set of useful data and information could be generated for the sound planning of such wetland areas.

The third chapter on coral reef ecosystems by M. V. M Wafar and Sayeeda Wafar provides a status assessment of Indian coral reefs, highlighting their biodiversity and productivity. They debate management issues whilst focusing on capacity building in taxonomy ecosystem analysis, gene prospecting, intellectual property rights, bio-safety and the role of national and international conventions for this threatened ecosystem.

A fourth chapter by S. Deshmukh and T. A. Rao deals with mangrove ecosystems in India. The authors give detailed information on the prerequisite bio-geo factors of mangrove ecosystems and highlight their ecological and economic significance to the coastal geography of India. The role of an indigenous knowledge system in the management and preservation of these delicate ecosystems has also been discussed and management options have been deplored especially in the context of Indian national conservation policy.

In chapter 5, Prakash Gole discusses the topical issue of wetland and river systems. This chapter would command special attention in India where a national river-linking project has recently generated great interest amongst both academics and policy makers. The author here suggests various steps to improve the ecological health of rivers if executed and implemented in a well thought out manner.

In the sixth chapter, Hemant Datye and Jyoti Parikh systematically describe the criteria and indicators needed for the effective planning and monitoring of wetland policies in the country. The authors start with a debate, in quite an objective and lucid style, on the need for GIS-based indicators and others like Natural Capital Index (NCl). They also examine the role of indicators in a temporal and spatial comparison of wetland distribution and resilience. This is an excellent chapter giving a critical yet comprehensive overview of criteria and indicators that could be of help to managers of wetland environments.

The seventh chapter is rather disappointing where Hemant Datye and Jyoti Parikh go on to provide a review of existing market and non-market-based valuation techniques. They demonstrate the application of these techniques with some, although not all, of the case studies in India, but they could have taken this a step further by describing where a particular method would be applicable. By doing this they would have highlighted the limitation of valuation techniques in capturing some of the ecosystem services of wetlands. Issues such as trade offs, thresholds, and discontinuity in ecological function command the central stage in the valuation of wetland environments and surprisingly they have been left untouched in this chapter. In fact, a number of studies on the management of wetlands done just after the Capacity 21 Programme, under the Capacity Building Programme in Environmental Economics by the World Bank (1998–2003) have gone much further in the direction of methodological development. Hence the more initiated reader may find this chapter too general.

Chapter 8 by V.S. Vijayan and Lalitha Vijayan, chapter 9 by Prashant Mahajan, and chapter 10 by Kanchan Chopra are all based on Keoladeo National Park – just one of the significant 'Ramsor' sites in India. Chapter 8 focuses solely on the aquatic biodiversity of the park, whilst chapter 9 assesses the feasibility for conservation in harmony with its use as a major public recreational facility. It describes how attempts to change the perception for conservation are made by enhancing the flow of information and education between the different stakeholders and how conservation strategy would be affected if the needs and priorities of the local population were to change. These chapters are limited in their scope but do provide a useful analysis of ecological criteria and characteristics of this Ramsor site. Analysis of baseline surveys on community participation in wetland conservation and the application of this to experimental phase design as a consequence of public awareness seem to suggest that people would prefer to conserve the park. Clearly, this presents the opportunity for the stakeholders to create the mandate for capacity building and conservation.

In chapter 10, Kanchan Chopra does an excellent job of applying TCM (for which the data requirement is usually huge) to eco-recreational benefits, which are rooted in the tradition of neoclassical economics, whilst at the same time using multicriteria analysis as well that is rooted in the premise of ecological economics. Here the author has been successful in bridging the epistemology of two schools of thought and has clearly made this issue significant in the context of less-developed countries like India. However, the author has presented only the recreational benefits of TCM and the reader is left wondering whether there is any other value to Keoladeo National Park.

In chapter 11, B.C. Choudhury and T.L. Raghu Ram review the existing policy regimes for wetland conservation and finally, in chapter 12, the volume editors analyse the lessons learnt and further desirable response options for the conservation and sustainable use of wetland ecosystems in India. One useful suggestion is the development of a National Wetland Strategy, but the rest is rather vague and does not present any new insights. For example, the benefits of the economic evaluation of wetland areas do not emerge clearly in a situation where the decision makers undoubtedly face the competing demands for their varied land use requirements. Thus, some focus on synergy and tradeoffs among the various ecological functions of wetland ecosystems could have been extremely useful from a planner's perspective and, issues of property rights, wetland conservation, and policy failures could have been explored further in order to illustrate the practical problems in their sustainability. Even if these issues are touched upon here and there, they merely seem to reiterate government guidelines and a 'to do list'. Instead, the whole synthesis should be policy relevant and not policy prescriptive.

The book leaves much to be desired in terms of methodological development and perspective on many of the issues raised. Every chapter has been written independently and there is plenty of repetition especially on national policy for wetland conservation and its social and economic significance. On page 22 of their introduction the editors explain how they have grouped chapters into four sections; however, this is not apparent to

the reader since many of the chapters are, in a sense, eclectic and do not conform to the grouping referred to. For example, chapter 2 could have been integrated easily into the technical theme of the ecological assessment of wetlands covered in the first five chapters if there were distinctly structured sections. There is also some overlap in their coverage of planning and policy that some careful editing could have eliminated.

In spite of its limitations, this book admirably brings together cutting edge research of wetland environments in India and opens the vistas for an integrated multidisciplinary analysis of a fertile but threatened ecosystem. The book definitely fills the gap between wetland scientists and decision makers at all levels. Objective but scientific assessment of wetlands in India like those in this book would provide a critical reference for the policy makers if they chose to take sustainable action. It is felt that good science does not always result in good decisions but one cannot arrive at good decisions unless authoritative and useful scientific information is presented to decision makers through a process they cannot ignore.[1] This book is a leap forward in this direction.

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Simon A. Levin, *Fragile Dominion: Complexity and the Commons*, Perseus Books, ISBN 073820319X

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The interesting thing about complexity is that it results from simplicity. When lots of different individuals interact in varying ways, the end result is complex behaviour, even though each interaction may in itself be simple in nature. The understanding of the relationship of interactions across a range of scales in space and time is one of the most fascinating and challenging subjects in modern ecology. Theoretical studies show patterns that are delightfully predictable in their unpredictability. A seemingly random series of fluctuations, in say a population of organisms, can be reduced to a straight line when appropriately transformed, but we cannot

[1] Reid, Walter V. and Georgina M. Mace, Taking Conservation Biology to New Levels in Environmental Decision-Making, *Conservation Biology, Vol. 17, No. 4*, August 2003, Pages 943–945.

predict the amplitude of the next fluctuation. Much of the behaviour in human society is geared to minimizing the risk of the next big fluctuation. Drivers of fluctuations can be either external to society, such as climate change, or internal, such as violent political conflict. One of the ways that we minimize risk is through equitable management of common pool resources. Such management systems can be complex and dynamic. For example, the Maasai of eastern Africa manage the impacts of drought through a carefully controlled system of entitlements and obligations that facilitate access to natural resources for rich and poor alike. With the subtitle of '*Complexity and the Commons*' I would expect this book to tackle some of these topics.

The text results from lectures given by Simon Levin in the Stanislaw M. Ulam series which are an annual event at the Santa Fe Institute in New Mexico. The theme of the lectures is the current human-induced potential ecological disaster facing all of us in the fragile dominion of our own habitat. The key question addressed is management of the global commons, in particular the biosphere and the diversity of life it contains. The text runs through contemporary ecological knowledge in an accessible and informal way, covering topics such as patterns in nature, ecological assembly, evolution, form and function. The opening chapter contains some references to stories from the Christian religion contained in the Old Testament, and the final chapter ends with similar parallels with some commandments for environmental management.

It is difficult to write a popular account of scientific knowledge and how it can effectively be used for the benefit of humankind, and in many places this book gets rather muddled. The use of a particular religious example as a way of examining the interaction between human society and the rest of the natural world does not work very well and we are lead up teleological blind alleys on a number of occasions. Moreover there are no references to other widely held belief systems or philosophies that are of interest in developing appropriate environmentally responsible global management. Sometimes other highly contentious parallels are drawn without detailed explanation, such as that between Adam Smith's invisible hand and the ontogeny and evolution of ecosystems. There are also inaccuracies in reporting scientific findings, for example the case of industrial melanism in the peppered moth has been seriously questioned, and extreme caution must be used in extrapolating laboratory experiments investigating links between diversity and ecosystem function. A similar lack of prudence is applied to interpreting social history. For example the Irish potato famine was not solely due to the impact of a catastrophic pest outbreak, but was deeply rooted in well-documented social and political injustices. New ecological thinking on complexity is exciting and innovative, and we are faced with pressing issues in the management of the global commons. However this is probably not a good book with which to start an understanding of these topics as it never really gets to grips with the subject.

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