

figures from the primary literature creates inconsistency in style, quality, and detail of information. Some figures are very bold and straightforward; others are very complex; others are in color for no apparent reason. Other details are excellent: for example, the sidebars are very informative, the temperature section has a strong discussion on units and complexity of heat measurements, and the section on polar history and exploration is great, but too short.

The authors do an excellent job of noting that the strength of physiology comes from the integrative approach: considering the animal as a whole and recognizing that there are multiple stressors on the animal. I agree with them that this approach must be emphasized in our teaching of physiology. That is, it does the animal no good to alter a physiological function to fix one problem, only to have that fix cause a different and perhaps more serious problem in some other system.

One last aspect of this book deals with an almost philosophical approach to teaching environmental physiology. I know scientists that follow both schools of thought, and some will find the text just fine while others may have a problem. The issue is this: the book is heavily human based, and most of the details in the chapters relate to how some particular problem is important for humans. This is a good approach when teaching students who may have a strong background in classic physiology, as it will introduce them, perhaps for the first time, to a suite of environmental problems that face humans. Just enough work from other species is included to let these students know how other animals have dealt with these problems. Because of this focus, the authors use the term “extreme environments” in a manner slightly different from the way it is used in classes or books that focus on a broader suite of animals. For example, the heat of the desert is used as an example of “extreme” in relation to humans. But, for desert-living animals, this heat is perfectly normal, since they have adapted to that environment. Likewise, humans would not be able to tolerate the 1000 ATM of pressure that exist in the ocean’s greatest depths, but to the animals that live there, the 1 ATM pressure of the surface would be “extreme.” What is extreme to humans is perfectly normal to the animals that occupy that niche. The authors do note that animals live in these environments (like seals diving to 1500 m), but the reader comes away with the feeling that all environments not occupied by humans must therefore be extreme. Once again, to the student being introduced to environmental physiology for the first time, it is fascinating to know the limits that humans face and that some animals live beyond those limits. But to students already deeply involved in animal environmental physiology, the human focus may seem too narrow. This is why I recommend that this book be read simultaneously with a broader text.

In summary, *Principles of Integrative Environmental Physiology* achieves its goal of presenting the ways in which organisms meet differing environmental challenges and the idea that the animal must be taken as a whole. It has

some of the most detailed experimental information I have seen in general texts at this level and should be well received by teachers and students as they expand classical physiology into environmental physiology.

#### REFERENCE

SCHMIDT-NIELSEN, K. 1997. *Animal physiology: Adaptation and environment*. 5<sup>th</sup> ed. New York: Cambridge University Press.

*Michael Castellini*  
*Laurence Irving Building*  
*Institute of Marine Science*  
*University of Alaska*  
*Fairbanks, Alaska, U.S.A.*  
 99775

COMMONS IN A COLD CLIMATE. COASTAL FISHERIES AND REINDEER PASTORALISM IN NORTH NORWAY: THE CO-MANAGEMENT APPROACH. Edited by S. JENTOFT. Paris, France: UNESCO and Carnforth, UK, 1998. Man and Biosphere Series Vol. 22. xvii + 353 p., b&w illus., tables, figures, bib, index. Hardbound. £48.00.

This collection of essays is a result of the Norwegian Man and Biosphere (MAB) research programme, coordinated by the book’s editor and based on field research between 1992 and 1996. Although multidisciplinary in scope, the bulk of the chapters were written by social scientists. Not surprisingly, therefore, the main emphasis is on the economic, social, cultural, and institutional aspects of natural resource management. The objective of the volume is clearly to bring together the two major primary industries in North Norway—fishing and reindeer pastoralism—for a comprehensive comparative analysis that can offer possible ways to improve management regimes not only in Norway, but elsewhere as well.

The book is divided into three parts. Part 1, “Sustainable resource use and management: The challenge,” comprises half the volume and is a mixed bag of papers, ranging from problems of estimating carrying capacity to gender relations. There is a certain discontinuity between reindeer pastoralism and fishing in this part. The three chapters on pastoralism—i.e., those on reindeer carrying capacity (J. Fox), bioeconomic modelling of pastoralism (A. Skonhøft), and adaptation strategies under technological change (J.Å. Riseth and A. Vatn)—were written by a biologist and three economists, and they all feature quantitative models. On the other hand, with one exception (U.R. Sumailai’s short paper on the optimal landing strategies for cod and capelin in the Barents Sea), the chapters on fishing societies were written by scholars trained in the “softer” social sciences and are more qualitative in

character. These latter chapters deal with the need for flexibility in the coastal fisheries (R. Nilsen, S. Eikeland), the threat to that flexibility caused by new regulations imposed in 1989–90 (T.A. Lillevoll), and the ways that distribution of quotas have benefitted men at the expense of women in the fishing societies (Munk-Madsen).

Part 2, entitled “Ecological knowledge: Implications for resource management,” includes only four chapters, all related to fishing, which makes this the most coherent part of the volume. The chapters by A. Maurstad and J.H. Sundet (on fishermen’s knowledge of stock identities in the fjords) and E. Eythórsson (on relational aspects of local knowledge in the fisheries) both take up the schism between science and user knowledge. Whereas the former deals with the local notion of spawning stocks of cod within fjords, a notion only recently taken seriously by scientists, the latter discusses how both parties at times might be “wrong.” The chapter authored by E. Eythórsson and S.R. Mathisen analyses how Saami ethno-political mobilization has entered the discourse on local knowledge. And in his paper on the cognitive foundation of fishing, G.R. Karlsen challenges the notion that local fishermen are knowledgeable about local ecology, making the important point that ecological adaptation should not be confused with ecological knowledge. Although other contributors may not share this view, it is a strength of the book as a whole that user knowledge is not unduly romanticized.

Part 3, “User involvement and decision-making: The co-management approach,” deals with preconditions for successful co-management regimes. J.K. Kalstad argues in his chapter on pastoralism and management of common land for the importance of integrating user knowledge with management, whereas S. Karlstad, in his paper on critical factors for a robust system of local management, suggests that effective monitoring systems and sanctions are crucial preconditions for binding collective agreements. In his comparison between organizational barriers to co-management in the fisheries of St. Lucia and Norway, H.T. Sandersen prefers to emphasize the importance of cultural values and experience with civic society. Writing on the basis of a case study from a fjord where a fleet of large vessels “runs” over local fishermen in the quest for herring, B.K. Sagdahl pleads in more general terms for the considerations of the local resident fishermen, while B. Aarset discusses the structural and political obstacles to viable cod ranging in Norway. Part 3 makes a strong case for a co-management approach that considers social and cultural priorities and not only the economic ones.

It is impossible in a short review to do justice to all the individual papers. But in general they are well researched and argued, although at times some of the contributors take too much of the Norwegian context for granted, which may occasionally create problems for foreign readers. At other times, similar terms and concepts are explained by a number of authors, which makes the reading a bit tedious. This is a minor complaint, however, as repetition is a trade-off for the desire to render each of the contributions

readable in isolation. It can therefore be argued that this volume reads better as a collection of individual papers than as a unit. The uneven coverage of the two industries in both subject matter and research profile also points to such a conclusion, which to some extent undermines the book’s comparative strength.

The idea to bring together papers on fishing and reindeer pastoralism is not novel. A book published in Norwegian in 1991 had a similar focus (Stenseth et al., 1991), as did the Nordic research project “Common property and environmental policy in contemporary perspective.” Obviously there are many parallels between fishing and reindeer pastoralism, and bringing these two industries together could generate important new insights. In his introduction, Jentoft nicely summarizes the main issues and concerns dealt with in the volume, but without drawing the more theoretical implications. Ottar Brox brings his point home more forcefully in the concluding chapter, where he stresses that the problems in “establishing viable common resource management regimes are not so much academic as they are political” (p. 344).

Other lessons to be learnt are that (1) flexibility in resource use makes adaptation more robust; (2) “small is beautiful,” i.e., small boats and herds are better able to cope with fluctuations and handle the environment with greater care; (3) differing local conditions require decentralization of management; (4) resource management may cause stratification; (5) co-management may create problems about who should have a voice; and (6) ecosystems that include fish and reindeer are inherently unstable, and stable carrying capacity or catches are therefore unrealistic goals. The latter observation has important implications for the whole notion of sustainability, but this point unfortunately is not pursued. Nor is the seeming contrast in the state’s position on territory in coastal fisheries and reindeer pastoralism: whereas territorial divisions of reindeer pastures have been encouraged, the open access to sea space seems to be held sacred. Thus the only remaining means to close the fisheries are licenses and quotas, means that clearly have not benefited small-scale local fishers.

This may, I believe, connect to the major shortcoming of the book. The subject of the commons (*allmenning*), as an institution in Norwegian society at large, is not taken up for discussion. Which is a pity, because the *allmenning*—the history of which can be traced back to the Viking age—holds an important position in contemporary Norway and may serve as a model for other co-management arrangements. That the commons in North Norway, by an accident of history, were converted to state property—a situation now increasingly challenged by local residents—does not diminish their relevance. A few blemishes should also be mentioned. Footnotes frequently appear on wrong pages, and Norwegian terms are translated differently by various authors. A couple of the contributions would have benefited from more heavy-handed copy-editing.

These complaints aside, the book has considerable merit. Its comparative approach has already been noted, as has

the generally high quality of the papers. It is, moreover, a welcome addition to the still relatively meager English literature on Norwegian fjord fisheries. That many of these fishers are Saami is an additional asset. The book is therefore strongly recommended to anybody interested in the management of fisheries, but should also have something of interest to senior students and managers of pastoral societies.

#### REFERENCE

- STENSETH, N.C., TRANDEM, N., and KRISTIANSSEN, G., eds.  
1991. Forvaltning av våre fellesressurser—Finnmarksvidda og Barentshavet i et lokalt og globalt perspektiv [Management of our common resources—Finnmarksvidda and the Barents Sea in a local and global perspective]. Oslo: AdNotam.

*Arne Kalland*  
*Department of Social Anthropology*  
*University of Oslo*  
*P.O. Box 1091 Blindern*  
*N-0317 Oslo, Norway*