

and perception and Banquet speech at the Singapore Conference in Honour of Murray Gell-Mann on his 80th birthday.

Having lived through some of the most turbulent times in history, Yang came in contact with many great men. He is very frank indeed when it comes to assessing other scientists. Of Fermi he says, 'He did not practise one-up-manship. He exemplified, I always believe, the perfect Confucian gentleman.' He also notes about Zhou Guang-Zhou, 'His style of doing physics reminds me of that of Landau, Salam, and of Teller. But in personal relationship Zhou is a perfect Confucian gentleman, without aggressive edges...' On S. S. Chern he says that while Chern considered himself only a *luohan*, '...then Chern's creative extension of differential geometry will relate to a most fundamental structure of the physical universe. Would the future main hall of the temple of mathematics not welcome its new *bodhisattva*?' Yang has remarkable words of kindness for many of his peers. He often describes those he came across as 'brilliant'. The generous nature of Yang is pervasive in the book. His admiration for China and fellow countrymen is also apparent. A couple of stand-alone articles are: Flux quantization, A personal reminiscence and Journey through statistical mechanics.

Yang's quotations from many pieces of literature are also striking. He quotes the verse of Li Shang-Yin and Zhu Zi-Qing.

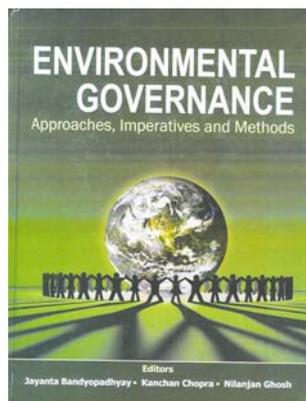
*Given the evening sun is so grand
Why worry that twilight is close at hand.*

Thus, in conclusion, it is a rare privilege to have been able to review the stupendous collection of a remarkable mind. This book is a must for any scholar and any library of repute.

ACKNOWLEDGEMENT. I thank Shayan Ghosh, Indian Institute of Science, Bangalore for a careful reading of the review.

B. ANANTHANARAYAN

*Centre for High Energy Physics,
Indian Institute of Science,
Bangalore 560 012, India
e-mail: anant@cts.iisc.ernet.in*



Environmental Governance: Approaches, Imperatives and Methods. Jayanta Bandyopadhyay, Kanchan Chopra and Nilanjan Ghosh (eds). Bloomsbury Publishing India Pvt Ltd, New Delhi. 2012. x + 386 pp. Price: Rs 1200.

In the contemporary world natural systems are under anthropogenic pressure and there is an urgency to sensitize the society to manage natural resources judiciously to counter the unsustainable trajectory of development (from the human well-being perspective). Environmental governance is emerging as a means of evolving consistent legal, economic and ecological frameworks applicable across global, national and local levels, involving the public and private institutions towards well-informed decision making to preserve the natural environment for the benefit of future generations.

The book under review is a compilation of select papers from the Fifth Biennial Conference of The Indian Society for Ecological Economics on 'Environmental governance'. Being a vast subject with inputs from many fields, the contributions by the authors encompass a variety of areas such as climate change, pollution, ecological economics, judicial activism, forestry and Gandhian principles. The book comprises 17 chapters organized into three sections, namely (a) approaches and challenges, (b) imperatives and instances, and (c) methods and tools.

At the outset, the editors outline the scope of environmental governance along the lines of the triple bottom lines (measures of economic value, social responsibility and environmental care, propounded by John Elkington in 1994). However, in this regard, a broader connotation of governance goes beyond the realms of the government and calls for a

systems approach to understand and tackle complex problems. In the second chapter, Forsyth presents the role of stakeholders in knowledge generation to avoid application of generalized knowledge to local challenges. He propounds an approach of politically oriented epistemology to uncritical positivism. The contradictions and conflict resolution – arising from the relative valuation of stakeholder values to elucidate the priorities in solving environmental problems – are not fully addressed in this account. In the next chapter the dynamics of multi-stakeholder functioning is elaborated with the example of Millennium Ecosystem Assessment (MA). Norgaard juxtaposes the reductionist approach of scientific explanations to environmental questions with the deliberative approach of MA. A case has been made for a broader approach involving quantitative, 'softer' analysis and local knowledge. It is apparent that a rethink on institutional design, away from segmented functions, is called for.

In chapter 4, Desai dwells on two specific scenarios of climate change, viz. moderate temperature rise and catastrophic increase. Each of these entails some imperatives on governance institutions. Considering the predominantly economics-focused analysis of climate change ramifications, the difficulties in bringing about a collective response is highlighted. The author hints at movement towards a cooperative and equitable basis of governance by sovereign states; but the challenge is evident, as the world witnesses prolonged deliberations by governments in arriving at actions for moderating the anthropogenic contributions to global warming. A feasibility analysis for generating as-is energy, by substituting fossil fuels with renewable sources, would have been insightful. In chapter 5 the role of the Intergovernmental Panel on Climate Change (IPCC) in environmental governance is presented by Sundararaman. IPCC only gives information and suggestions to policy makers on the options available to rein in global warming. As the nature of climate change is global, actions to reverse the trend have to adopt a 'think global; act local' approach. Common but differentiated responsibilities (CBDR) dilute the intensity of the global mission by linking development to disaster prevention. An odd comment by the author on empowerment of women appears out of context.

Citing several instances of Indian court cases, Sahu, in chapter 6, puts forth the two sides of judicialization of environmental governance: one, the benefits of course correction (due to court verdicts) in implementing environmental laws and the other, the interference of courts in policy matters. The author suggests studies to weigh the pros and cons of such judicialization and to find a balance. However, this appears to be an incremental approach. There is need for an overhaul of institutions in the context of sustainable development, of which environmental governance is only a part. Martinez-Alier, in chapter 7, brings to focus the complexities involving development and rights using an array of conflict scenarios. The conflict is between people promoting profitable ventures and locals who value the assets and services of the environment on multiple references such as livelihood, culture and tradition. Social metabolism is effectively used to highlight the nature of ecological conflicts in mining, transport, and waste and pollution management. In chapter 8, Parikh emphasizes the need to strike many balances in policy making when dealing with ecological and economic aspects. Setting certain facets as invaluable may sound simple, but this requires solving multi-stakeholder conflicts, a complex problem. Hints on accounting for ecological impacts and lost opportunities have been provided, but the drawbacks of monetary substitution have not been stressed.

From his own experience and other references, in the next chapter Alagh reminds us of the perils of long-term prediction of agricultural productivity; nevertheless, he concludes on an optimistic note. The difficulties in reckoning outputs of multiple models, each with different assumptions, is a real problem facing policy makers with regard to the future of Indian agriculture. (An error was found on p. 147: it should be 165 grams of cereal a day instead of 165 kg a day.)

In chapter 10, Ghate *et al.* draw attention to the ineffective implementation of the Joint Forest Management programmes and Forest Development Agencies, using three case-studies in Maharashtra, India. There is good scope for realizing the potential benefits of provisions of the law,

by prioritizing social institution-building with broad-based and true stakeholder participation. The role of culture and State power should be kept in mind while dealing with certain sections of society like the tribes. In chapter 11, Banerjee puts in perspective the conflict of interest between long-term actors and the local government in West Bengal, with regard to the Bidyadhari wetlands and the expansion of Kolkata. She exposes the nexus between government authorities and vested interests in changing the landscape to a desert to suit the profit-seekers, in contravention to the policy of wetland management. The pertinent question after reading this chapter is 'how can policy implementations be made tamper-proof?'

In chapter 12 the challenges to the Indian biofuel policy formation are presented by Nagar. The issues of land use and collateral damages to the local environment are familiar. However, the tussle between technology and social justice puts policy makers in a dilemma; there seems to be no easy option.

Self-discipline as a regulatory instrument is explored by Shukla in the next chapter. While elaborating the nature and state of environmental governance in India, the role of ethics is brought to the fore. Gandhian philosophy of decentralization of governance and austerity based on ethical premises, as exemplified by J. C. Kumarappa's Society of Service, is proposed as a way towards sustainable development. However, the suggestion of influencing individual behaviour, in a country with more than a billion people, seems idealistic in the absence of pragmatic methods to achieve it.

Chapter 14 outlines the various voluntary forest certification schemes. While highlighting some of the economic benefits, Kaechele *et al.* also emphasize the role of the state in ensuring social and environmental benefits. A gradual approach in terms of stringency of standards is advised to enhance the coverage of forests under certification. A note of caution is given at the end, citing the World Wildlife Fund: certification is not a panacea for solving the challenges in sustainable forest management.

Gupta, in chapter 15, explains the relative merits of maximum allowable emission norms and the rate of emission tax,

using a model based on small open economy and general equilibrium theory. He lists some conditions in which one or the other option is beneficial depending on whether the priority is social welfare or pollution control. It is not clear if the results will correlate well if assumptions like incomplete disclosure from unorganized sector are made. Few references to foreign direct investment and its role in relocation of industries to pollution require update.

In chapter 16, Sharma *et al.* have applied nonlinear bioeconomic modelling at the micro-watershed level to study utility to the inhabitants. Specific attention is given to the effect of policy options on land-use change and forest degradation. The authors have analysed the reasons for declining forest density. In conclusion, they favour migration of the rural population to urban areas ignoring the high demands for resources in an urban lifestyle. In chapter 17, Gupta has applied a modified Gordon-Schaefer model to study economic impacts, and a measure called economic biodiversity. He concludes that profit maximization and biodiversity conservation are in conflict with each other in the context of sustainable fisheries.

This compilation of 17 chapters provides glimpses of the challenges and potential approaches to environmental governance. The topic of environment eventually touches upon all knowledge areas – science and humanities – so there is a daunting task of separating problem from solution. However, some of the proposed solutions are high on principle, but lacking in practicality. One takeaway for the reader is the appreciation of the enormity of environmental governance issues, requiring the deciphering of myriad interconnects between the natural system and man-made institutions. The book is a good reading material for students of environmental management.

K. RAMANI*
MONTOMANI

*Centre for Product Design and
Manufacturing,
Indian Institute of Science,
Bangalore 560 012, India
e-mail: ramani.krishnaswamy@gmail.com