Book Review

- ECONOMICS OF POLLUTION CONTROL IN THE ASIA PACIFIC Edited by Robert Mendelsohn and Daigee Shaw (Edward Elgar Publishing Ltd, Cheltenham, UK: 1996) ISBN 1-85898-307 X; xiii+354pp; US$90

Since the Stockholm Conference on the Human Environment, a range of non-legal disciplines, including *inter alia*, developments in scientific knowledge and in the discipline of economics has influenced the development of international environmental law. At the United Nations Conference on the Environment and Development, the strategies to enable a global paradigm shift towards development that is sustainable, were set out in Agenda 21. Chapter 8 of Agenda 21 acknowledges that:

> Environmental law and regulations are important but cannot alone be expected to deal with the problems of environment and development. Prices, markets and government fiscal and economic policies also play a complimentary role in shaping attitudes and behaviour towards the environment.[1]

The objectives to facilitate the integration of environmental and developmental factors into the decision making process, include *inter alia*:

- to incorporate environmental costs in the decisions of producers and consumers and to reverse the tendency to treat the environment as a "free good" and to pass these costs on to other parts of society, other countries, or future generations;
- to move towards integration of social and environmental costs into economic activities, so that prices will appropriately reflect the scarcity and total value of resources and contribute towards the prevention of environmental degradation;
- to include, wherever appropriate, the use of market instruments in the framing of economic instruments and policies to pursue sustainable development.[2]

The discipline of environmental economics is an important tool to facilitate a shift towards sustainable development. Environmental valuation is based upon the simple (and controversial) assumption of "consumer sovereignty" preferences for improvements in environmental quality and resource conservation/consumption, should guide resource allocation. Neoclassical economists maintain that the level of satisfaction or level of economic welfare, experienced by individuals can be

1 Agenda 21: Programme of Action for Sustainable Development (United Nations, New York: 1993) ch 8, "Integrating Environment and Development into Decision Making", para 8.27.
2 Ibid at para 8.31.

measured by the prices they are willing to pay for the consumption of goods and services. Proponents of environmental valuation assume that the monetary prices that individuals would be willing to pay (WTP), for traditionally unpriced environmental goods, can be imputed from *inter alia*, observed behaviour and surveys. The sum of the individual WTP is therefore assumed to reflect the preference of society. Environmental economists use a multitude of valuation techniques to estimate the WTP for unpriced environmental goods and services. The monetary values obtained may then be incorporated into the decision making process at many levels.

Economics of Pollution Control in the Asia Pacific, consists of an introductory chapter followed by a collection of 15 chapters selected and edited by the authors from papers presented at the "Economic Perspectives of Pollution Control in the Pacific Rim Countries" Conference convened in Taiwan in 1994.[3] Consequently, seven of the chapters focus on Taiwanese case studies. The book is aimed at a readership fluent in microeconomic theory. There is no discussion of the inherent limitations of the neoclassical economic paradigm, rather the objective of the authors is to "lay the foundation for environmental policy" by the application of neoclassical economic theory to practical studies within the disparate economies of the Asia Pacific. Hence, proponents of alternative paradigms, such as deep ecologists or green socialists (who argue that the underlying values of neoclassical economics are incompatible with the concept of sustainability), would gain scant satisfaction from the book and would find much to criticise.

Many of the papers apply the various techniques of environmental valuation to the idiosyncratic socio-economic conditions extant within the region, with particular attention directed towards the effects of atmospheric pollution. Following the introductory chapter, the book kicks off with a trio of papers that examine the regional economic implications engendered by the phenomenon of global warming. The paper by Wu[4] attempts to predict the reductions to rice yields in Taiwan engendered by an increase in local temperatures and precipitation. The model employed by the author establishes a dose-response relationship between changes in environmental quality parameters and the productivity of rice. The author concludes that an increase in temperature by 2.5 degrees centigrade would reduce rice yields by 1.8 per cent.

Mendelsohn's[5] paper utilises the scientific data produced by the Intergovernmental Panel on Climate Change[6] to predict the magnitude of climate change

3 Organised by the Institute of Economics of Academia Sinica in Taiwan.

4 Huoying Wu "The Impact of Climate Change on Rice Yield in Taiwan" in Robert Mendelson and Daigee Shaw (eds) *Economics of Pollution Control in the Asia Pacific* (Edward Elgar Publishing, London: 1996) 60–77.

5 Robert Mendelsohn "The Impact of Global Warming on Pacific Rim Countries" in Mendelson and Shaw, ibid at 7–25.

6 Mendelsohn's model is adapted from the predictions made by the Intergovernmental Panel on Climate Change in 1990 and 1992, that envisages: an increase of global temperature by 2.5 degrees centigrade; an eight percent precipitation increase; and a 44 centimetre sea level rise, by 2060.

impacts on Pacific Rim nations. The total and sectoral results of global warming for each of the 20 Pacific Rim States[7] are comprehensively set out in tables at the end of the paper. The studies predict that although the developed economies will bear the largest absolute economic damage, the average impact per unit of Gross Domestic Product will be borne by developed States. Mendelsohn concludes that the predictions illustrate the disparity in incentives to control climate impacts, which will serve to further complicate future negotiations to address the issue of climate change.

The paper by Coppel and Lee[8] evaluates the significant opportunities that are offered by joint implementation initiatives to increase the overall economic efficiency of financial mechanisms designed to control the emission of greenhouse gases (GHGs). By deliberately ignoring the contentious debate with respect to the equity of joint implementation measures, the authors isolate the question of where abatement is undertaken from the polluter pays principle. The authors conclude that the flexibility to source emission cuts in the Asian region would reduce the overall costs of climate change policies and produce new sources of revenue for Asian economies. The models employed by the authors indicate that a uniform carbon tax would result in a reduced level of economic welfare in Asian States, hence additional economic incentives would be required to secure their participation in such a scheme. In contrast, the utilisation of specific tradeable emission quotas could improve the economic welfare of both OECD, and developing States. Shibata's[9] paper also focuses upon the international regulation of GHG emissions and the difficulties in setting an economically efficient carbon tax.

The next section of the book includes a selection of detailed studies designed to estimate the costs imparted by local atmospheric pollution. The authors employ various Contingent Valuation (CV) techniques that use a combination of surveys and questionnaires, to elicit information on the environmental preferences of individuals where market data is lacking.

The paper by Shaw *et al*[10] reports on a detailed epidemiological investigation of acute health impacts on the population of Taiwan engendered by a rise in atmospheric pollutants. Alberini *et al*[11] apply CV to discover the WTP of Taiwanese city dwellers for reduced morbidity. The paper contains detailed information relating to the survey design and a copy of the CV questionnaire is annexed to the paper. Lu *et*

7 The States are: Australia; Canada; Chile; China; Columbia; Ecuador; Indonesia; Japan; Malaysia; Mexico; New Zealand; North Korea; Peru; Philippines; Russia; South Korea; Thailand; Taiwan; United States; and Vietnam.

8 Jonathan Coppel and Hiro Lee "The Framework Convention and Climate Change Policy in Asia" in Mendelson and Shaw, note 4 at 26–59.

9 Hirofumi Shibata "Doubtful Merits of Equal-rate Pigovian Taxes and Tradable Permits in Controlling Global Pollution" in Mendelson and Shaw, ibid at 296–319.

10 Daigee Shaw *et al* "Acute Health Effects of Major Air Pollutants in Taiwan" in Mendelson and Shaw, ibid at 78–107.

11 Anna Alberini *et al* "What is the Value of Reduced Morbidity in Taiwan?" in Mendelson and Shaw, ibid at 108–149.

al[12] compare and assess the disparate results derived from various CV techniques to calculate the WTP for improvements in air quality in Taiwan. Despite the variance in the results obtained by the various surveys, the authors are confident that CV methodologies have a valuable role to play in future policy formulation. Wu and Hsich[13] apply CV techniques to the valuation of improvements of water quality in Korea. Their study produces ambiguous results similar to the study by Lu *et al.*

The Hedonic Pricing, Property Value (PV) approach is utilised by Yang[14] and Kwak *et al*,[15] to estimate the WTP for improvements in air quality in Taipei and Seoul respectively. The PV approach is based on the concept that the differences in environmental quality are reflected in housing prices in different locations of varying levels of atmospheric pollution and isolate the influence of ambient air quality on those values. Both studies conclude that a reduction in airborne particulates would result in significant monetary benefits in both cities.

The final section of the book contains a number of more theoretically oriented papers. Huang[16] and Chen[17] both employ multiple-party game theory to assess the behaviour of legislators, regulators, and private agents operating in the imperfect markets extant in the region. Huang examines the issue of domestic environmental regulations under incomplete enforcement and concludes that the regulator will generally not enforce regulations to the standard set by the legislator due to the benefits that bribery confers to polluting firms. Chen analyses the efficiency of free trade in the face of transboundary pollution. The papers by Geaun,[18] and Hung and Chang[19] assess the allocative efficiency of various environmental policy instruments.

Overall, the book demonstrates the ample opportunities to utilise the various techniques of environmental economics to assist in the formulation of effective and economically efficient, environmental management policy in the region. The incorporation of data relating to the design of surveys and questionnaires will be of

12 Alan Yun Lu, Richard C. Bishop, and Michael P. Welsh "Measuring the Benefits of Air Quality Improvement in Taipei: A Comparison of Contingent Valuation Elicitation Techniques" in Mendelson and Shaw, ibid at 182–198.

13 Pei-Ing Wu and Wen-Hua Hsich "Demand for Environmental Quality: Comparing Models of Contingent Policy Referendum Experiments" in Mendelson and Shaw, ibid at 227–252.

14 Chung-Hsin Yang "Hedonic Housing Values and Benefits of Air Quality Improvement in Taipei" in Mendelson and Shaw, ibid at 150–170.

15 Seung-Jun Kwak, Gye-Pyeong Lee, and Youngsub Chan "Estimation of the Benefits of Air Quality Improvement: An Application of Hedonic Price Technique in Seoul" in Mendelson and Shaw, ibid at 171–181.

16 Chung-Huang Huang "Hierarchical Government, Environmental Regulations, Transfer Payments and Incomplete Enforcement" in Mendelson and Shaw, ibid at 253–272.

17 Kai-Lih Chen "Political Economy and Pollution Regulation: Price Regulation in Open Lobbying Economies" in Mendelson and Shaw, ibid at 273–295.

18 Jerome Geaun "Difficulty in Enforcing Efficient Prices for Regulating Shiftable Externalities" in Mendelson and Shaw, ibid at 320–334.

19 Victor T. Y. Hung and Pamela Chang "Optimal Environmental Quality Improvement in a Multi-Goods R&D Growth Model" in Mendelson and Shaw, ibid at 335–350.

particular interest to readers who may wish to adapt such techniques in other locales. The theoretically oriented papers serve to illustrate the complexities in selecting and setting appropriate policy instruments that produce economically efficient outcomes. This collection effectively achieves an objective of the editors, to serve "as an introduction to the growing body of regional talent in the Asia Pacific who will play an important future role in environmental policy-making throughout this region".[20]

MARK DRIVER
Master of Environmental Law candidate, Faculty of Law, University of Sydney, Sydney, Australia

20 Robert Mendelsohn and Daigee Shaw "Asia Pacific Environmental Economics" in Mendelson and Shaw, ibid, 1 at 6.