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Book reviews

Valuing Nature with Travel Cost Models: A Manual, by Frank A. Ward and Diana Beal. Published by Edward Elgar, Cheltenham, UK, 2000, pp. viii + 255, ISBN 1 84064 078 2, £49.95.

The Travel Cost Method (TCM) has a relatively chequered history as a non-market technique for the estimation of recreational benefits. Its origins can be traced back to 1947 when Harold Hotelling wrote a brief letter to the Director of the USA National Parks Service. In it, he sketched out a possible way ‘to set up appropriate measures for evaluating, with reasonable degree of accuracy, the service of national parks to the public’ in less than a page. From this little thing, big things certainly have grown. The growth has been both in the scale of application and the complexity of the method.

Through its growth, the TCM has developed a reputation as a technique that is capable of producing defensible, non-market value estimates. It has been used extensively in the USA in the allocation of resources to and management of recreational areas. The results of TCM studies have also been used as the basis for determining compensation payable as a result of natural resource damage. Its use in Australia has been more modest but national park managers in both Victoria and New South Wales (NSW) have recently employed the technique to help justify their budgetary calls and to argue for the extension of the parks system.

Despite this growth, economists seeking to employ the technique have, up until the publication of this book, needed to undertake an extensive literature search in order to familiarise themselves with the theory and mechanics of the TCM. Environmental and resource economics textbooks have typically devoted fewer than a dozen or so pages at most to broad descriptions of the method whilst specialist journal articles have typically assumed a high degree of reader familiarity. The goal of this book is to fill this gap. The gap is now filled.

The first four chapters of the book aim to locate TCM within the theory and practice of welfare economics and environmental policy decision making. The chapters are written specifically with policy makers and resource managers in mind. The treatment of the topics in Chapters 1–3 is basic but solid. The concepts described build from the notions underpinning benefit–cost analysis and progress to demand analysis via, first, a description of the types of circumstances in which TCM applications can be of use and, second, examples of those applications. The emphasis of the book is firmly on US

applications. Few details of European experiences are provided. The Australian experience of the method is given some, but limited, exposure. This is disappointing given the recent efforts of the NSW and Victorian park management agencies to develop a portfolio of recreation valuation studies that have centred on the use of the TCM.

The fourth chapter develops the theory of benefits that is central to TCM. This is necessarily a technical issue in which the Hicksian and Marshallian concepts of welfare change are related to the process of building a TCM model. Whilst the chapter provides a neat encapsulation of the equations needed to solve for the welfare impacts of various policy changes, the logic of these specifications could have been explained better with reference to the simplicity of Hotelling's initial suggestion. That is, it would have been appropriate for the authors to explain the relationship between the trip generation function and the demand curve. Such a conceptual explanation would be of great assistance to those who will otherwise struggle with the equations.

The remainder of the book seeks to widen and deepen the reader's understanding of the TCM. It does so by discussing numerous variants on the basic TCM model. In doing this, many of the problems that users of the TCM encounter are detailed, along with suggestions for their solution. Chapters 6, 7 and 8 are of particular importance to those who will apply the TCM, as they are concerned primarily with aspects of survey and questionnaire design and data management and analysis. Finally, the authors assess the issues likely to develop in the TCM literature and provide an extensive annotated bibliography. The latter is a particularly useful resource to those who find that elements of the book raise more questions than it answers.

The book does strike some difficulties in performing the role of filling the gap between general text and specific journal article. First, there is some doubt as to the likely audience for the book. Whilst its initial chapters are designed to be readily understood by the non-economist resource manager, such a reader is likely to struggle with the material in Chapter 4, which details the benefits theory that underpins the TCM. If that hurdle can be overcome, the rest of the book, which deals with some of the more practical aspects of carrying out a TCM, is again friendly toward readers without a strong economics background. If it can't, then a gap will persist in the reader's mind between elementary theory and the practice of the method.

Who then will find this book useful? Those experienced in the use of the method will find it to be a good overview of the TCM. Perhaps it will also help those who have been away from the literature for some time to refresh and update their knowledge. For those with an economics training that has not embraced non-market valuation and who are interested in extending their

skill base to enable them to perform a TCM application, the book will expedite the learning experience. The book should also prove useful to those who need to know what is involved in a TCM application without necessarily needing to perform one. For instance, resource managers and policy makers would be able to read selectively from this book to generate sufficient understanding of the method to, first, determine the value of commissioning an application and, second, gain an appreciation of the results it generates. It is doubtful that the book, by itself, will enable a non-economist to apply the TCM.

The second difficulty faced by the book is its possible 'over-selling' of the TCM. The authors have correctly identified many of the problems that have been (and continue to be) encountered by users of the method. Yet these problems are not made prominent at the outset. The early chapters are strong in their exposition of the strengths of the TCM without much mention of its weaknesses. For instance, the ability of the technique to deal with non-use, non-market benefits and costs is particularly limiting in its role of 'valuing nature'. Such limitations have driven economists to look to the development of stated preference techniques such as contingent valuation and choice modelling. Other factors limit the reliability of the estimates that applications of the TCM generate. Of course, no valuation technique – neither market nor non-market – can be perfect in either coverage or accuracy. However, the responsibility of those developing and describing alternative techniques is to provide an assessment of both the strengths and weaknesses.

Overall, Ward and Beal have produced a volume that will be a useful addition to the collection of environmental and resource economists who are – or want to be – involved in the estimation of non-market values. For them, the subtitle *A Manual* is fitting. Those who have sought to teach the TCM to undergraduate and graduate classes will find that it makes a good reference book for students who want to take their understanding of the TCM beyond the cursory level provided by the majority of textbooks.

JEFF BENNETT

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National Accounting and Capital, by John M. Hartwick. Published by Edward Elgar, Cheltenham, UK, 2000, pp. xv + 214, ISBN 1 84064 206 8, £55.

When macroeconomics changed from being based on aggregate accounting identities and equilibrium conditions, typically in an atemporal setting, to a discipline based on disaggregated, intertemporal optimising models, the atmosphere was one of turmoil and upheaval, with words like 'revolution'

being used in articles and book titles, and a sense of factionalism between groups of hostile protagonists. Since the 1970s, a similar transformation has profoundly altered the landscape of national accounting analysis, but the seismic impact has been negligible by comparison. It is almost as if a paradigm shift occurred without anyone noticing.

There has always been tension between what national accountants designed the accounts to measure and how economists have tried to interpret them. In their original guise as measures of output, the main aggregates are atemporal, based on market prices and constructed around accounting identities. Economists have conceptualised income first and foremost as a dynamic concept linked to changes in underlying wealth. They have also tried to put more complex interpretations on the national accounting aggregates, as measures of (for example) well-being or of sustainable development, thus giving the aggregates (and their component parts) a normative and intertemporal interpretation inconsistent with the principles underlying their original derivation. Thus economists have sought to recast the theoretical foundations of national accounting and, accordingly, to change the way accounting aggregates are measured and constructed.

A key difficulty arises for economists when considering capital. Accountants measuring economic activity can legitimately add current output of capital goods to current consumption. However, economists' underlying conceptions of income are based on consumption, not on the hybrid of consumption and capital accumulation that Hicks regarded as only an *ex-post* approximation to what he called the 'central criterion' of consumption without impoverishment. A key innovation was presented in Weitzman (1976) when he argued that investment could be treated as discounted additional future consumption and, as such, legitimately added to current consumption. The end result is a measure of net product (based on the Hamiltonian function from the dynamic optimisation problem) that is the stationary equivalent of a return to the economy's wealth. This innovation, now ubiquitous in the literature, represents a significant departure from the more ad hoc economic interpretations of adjusted income that preceded it.

Which brings us to Hartwick's book. He has been a leading figure in the development of the Hamiltonian approach and its application in deriving adjusted accounting rules, particularly with regard to natural resources. This being said, the book is not an encyclopaedic treatise on the optimal control approach to national accounting. This function is better performed by Aronsson *et al.* (1997). This is a book, as the title suggests, looking at the relationship between income and capital and, as such, it serves as a complement rather than a substitute to that volume.

It oversimplifies conveniently to claim that economists, in considering how to modify measures of national income, fixate on what counts as capital, and

how changes in that stock of capital should be properly measured (what is the dynamic relationship between flow and underlying stock?). National accountants, instead, fixate on where an adjustment item will fit into the system of accounts, given the implication of double-entry bookkeeping that things must balance (how can the relevant accounting identities be maintained?). A novel feature of Hartwick's book is that while he emphasises income as a dynamic concept derived from (as the book's title highlights) an underlying capital stock, he also takes seriously the idea of reconciling the expressions for income, ensuring the income–expenditure accounting identity is maintained. The book features extensive use of social accounting matrices (SAM) for this purpose. This raises the standard for future national income research in the optimal growth tradition.

Does this combination – derivation of income expressions from optimising models and the use of SAM to maintain the integrity of the key accounting relationships – mean that the economic and accounting approaches to income have finally been properly reconciled? I confess to remaining sceptical.

As remarked already, the national income figure produced in national accounting terms is a descriptive and atemporal measure. The way economists view income is as a normative and intertemporal measure. Being normative means it has some valid interpretation in terms of welfare economics, and being intertemporal means it is explicitly dynamic, and thus related to sustainability or welfare over time. Hartwick starts with a steady-state economy (Chapter 1) so that he can avoid complex intertemporal issues at first. Even here, though, normative elements creep in, in ways so standard that many economists would not bat an eyelid, such as inputs priced at their marginal products.

In national accounting practice, market (not shadow) prices are used for inputs and outputs. Even accepting shadow prices should be estimated for particular adjustment terms (e.g. resource depreciation), market prices are still being used to construct the gross measure from which depreciation is deducted. How far market prices are from first best values, and the implications for the welfare interpretation of income, constitute important and under-researched questions. Explicitly intertemporal elements arrive with the unheralded appearance of a Hamiltonian function in Chapter 3, and continue to feature after that. The price of capital is now being assumed to accurately embody information on future capital productivity, as well as trade-offs between different types of capital. If the measures produced from these optimal growth models are implausible, will fitting them into a SAM make them less implausible?

The book has a number of idiosyncrasies. Some of these relate to coverage of material. For example, in the chapter on exhaustible resources, no

mention is made of the user-cost approach advocated by El Serafy (1989), an approach that has been widely used in case studies of resource-dependent economies. Hartwick himself, with Anya Hageman (1993), contributed to this debate, but it goes unmentioned here. Some of the idiosyncrasies concern slipshod editing. In Chapter 1 alone, 'M-capital' is used to denote 'machine capital' without clear explanation (distinct from K-capital?); labour is denoted by L or by N at different points; output is denoted by X in Table 1.1 and by Q in the accompanying text. Early on in Chapter 3, $S(t)$ denotes consumers' surplus, whereas later in the same chapter it is used to denote the resource stock. Equation numbering appears arbitrary. In some sections equations are meticulously numbered. Elsewhere, numbering is absent.

These issues are quibbles that can be overlooked. The book is an important contribution to the strictly neoclassical approach to analysing and calculating national income. Readers will not find an even-handed critical treatment of different approaches, nor an authoritative survey of the field, and they will learn almost nothing about what governments and statistical agencies are actually doing. They will get a unified treatment of topics of interest to the author, which makes the book essential reading for anyone interested in the growth-theoretic analysis of national income. They will have to look elsewhere for a broader treatment and for institutional or empirical details, and they will have to judge for themselves how plausible the optimal growth approach is for producing meaningful measures of national income.

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Distance, Drought and Dispossession: A History of the Northern Territory Pastoral Industry, by Glen McLaren and William Cooper. Published by Northern Territory University Press, Australia, 2001, pp. x + 202, ISBN 1 876248 56 4, \$36.30.

At the turn of the 20th century the pastoral industry was unquestionably the biggest industry in the Northern Territory (NT). Today the industry is still large and, although both mining and tourism are at least triple its size economically, most land in the NT is used in one form or another for pastoralism. Understanding how the past has shaped the development of the pastoral industry is therefore a necessary part of understanding how the extensive landscapes of northern Australia might be managed sustainably.

The title of this 10-chapter book signals some of the complex forces that have driven the pastoral industry in the NT. Others have been markets, regional land-use objectives and constraints, diverse and changing values about landscapes, tourism and research. The authors have written a local history for the everyday reader, but with a mind to the big picture. Major themes are the beginnings of the industry, consolidation in the early 20th century, post-war reconstruction and northern development, and Aborigines. The initial chapters deal with the establishment and early survival of the industry from the 1820s. A second phase of development occurred from the mid-1860s to 1895, coinciding with exploration of the interior of the continent and the various gold rushes. Despite considerable initial success the industry was in sufficient trouble by the 1890s to precipitate a Royal Commission in 1895. There were problems with transport, markets and disease, as well as conflict between Aborigines and pastoralists.

The 1890s and early decades of the 20th century saw the beginnings of technological revolution. Meat works, canneries and freezing works were constructed in the Darwin region. By 1911, Vestys had invested £1 million in the NT. This period also saw moves to encourage closer settlement in the North. Part of the strategy was to reintroduce sheep, which would involve breaking up the large leases into smaller holdings. Not surprisingly, cattlemen were hostile to such proposals. Given the undoubted environmental damage that is apparent today over vast areas of sheep country in semi-arid Australia, we can be thankful for the early cattlemen's resistance to the idea of sheep in the NT.

In detailing the events from the beginnings of the industry until about the turn of the 20th century, reflecting essentially upon the 'distance' theme, the book is thorough and readable. The taking up of leases; the size and number of leases; stock numbers and movement; and the emerging understanding

within the industry of the problems associated with running enterprises in a recalcitrant climate and landscape are all dealt with. From my perspective as an ecologist, however, it was disappointing, given the reference to 'drought' in the title, that the major droughts during this period (e.g. early 1890s and 1900s) were not treated in anywhere near the detail that the 'distance' theme was treated.

During the first four decades of the 20th century the industry consolidated. The authors concluded that the foundations of the industry were in place by about 1920. However, the impacts of the First World War and the Depression on the industry were barely mentioned, which I found surprising. World War II led, naturally, to greater demand for NT beef. More importantly, however, it spurred the rapid development of strategic transport and communication infrastructure. After the War the major issues were development and populating the North. The North Australia Development Committee (NADC) was formed in 1946. Its terms of reference were much wider than the concerns of Territory cattlemen, being also concerned with marine, mining, forestry, fuel and manufacturing industries. In 1952 an agricultural economist, J.H. Kelly, produced a report on the development of the beef cattle industry in northern Australia. Both the NADC and Kelly called for smaller properties and closer settlement. The account of the positions of the various interest groups on this important issue is very illuminating.

Less illuminating, however, was the treatment of the place of Aborigines in the history of the pastoral industry. The authors stated explicitly in their preface that 'with the advent of historical revisionism' pastoralists have been portrayed 'inaccurately and unfairly' in this area. Hence, they attempted to address this issue from 'the cattlemen's perspective' so as to 'provide a more comprehensive and balanced picture'.

Chapter 9 does provide a detailed account of cattlemen's grievances concerning responsibilities they had to bear on account of evolving Government policies towards Aboriginal welfare. I have no doubt that these grievances are historically accurate, and put the cattlemen's point of view fairly. There is a substantial critique of the work of sociologist Frank Stevens, who undertook extensive surveys of living conditions on NT stations between 1965 and 1967. Stevens is accused of bias, selectivity, and limited and unauthorised surveys. However, I feel that sustained and substantial evidence for the case against Stevens is lacking. Overall, the treatise on Aborigines failed to convince me of the authors' claims that other commentators had been guilty of historical revisionism. It is strange too that Native Title, Mabo and Wik were hardly mentioned in a book published in 2001, especially with the final chapter entitled 'Recent Developments'.

Although the book detailed successfully how different major drivers influenced the evolution of the industry, I was disappointed with the lack of a synthesis shedding light on how these different forces combined to result in the present status of the industry. In particular, there was no interpretation of those historical events that may have caused the change in the relative economic status of the industry between the beginning and the end of the 20th century.

On an editorial note, I felt that the book should have had a general reference map that indicates the location of the important places mentioned in the text. The maps that are presented are reproduced poorly, and in one case (the map of the stock routes in Chapter 8) no date is provided. The subject index is also scanty, consisting mostly of people, company and station names rather than ideas.

To summarise, I was impressed by the treatment of how distance and its associated themes have influenced pastoralism in the NT; however, the influence of drought could have received more attention. Finally, I found myself quite disappointed with how Aboriginal dispossession was dealt with.

DICK WILLIAMS

CSIRO Sustainable Ecosystems, Darwin

Managing Human-dominated Ecosystems, edited by Victoria C. Hollowell. Published by Missouri Botanical Garden Press, St. Louis, USA, 2001, pp. xii + 372, ISBN 0 915279 85 1, paperback, \$US39.95.

This book contains the proceedings of a symposium held at the Missouri Botanical Gardens during 26–29 March 1998. The symposium was organised by a group of leading USA scientists in the areas of environmental economics, ecology and conservation biology. Although the context of the symposium and the title of the book promise a truly interdisciplinary outlook, the book turns out to be a mixed bag, containing a few good papers and a number of mediocre papers.

The symposium focused on ecosystems services, the capture of values attached to those services, and the outlook for these values in the future. The book contains 19 papers, organised into five parts. Given the breadth of the material covered in the book, a review of each paper will not be attempted here. Rather, I will discuss those papers likely to be of greatest interest to the readership of this journal, and offer my impression of the book in general.

The first part of the book, entitled 'Ecosystem services: characterisation of the function and principal threats', starts with a general overview of ecosystem services written from an ecologist's perspective. This paper presents interesting information regarding biogeochemical cycles and the

nature of biodiversity loss, particularly in the context of anthropogenic alterations of ecosystems. It also provides two appealing analogies: (i) the 'portfolio effect' in ecosystems, referring to the contribution of biodiversity to stability in biomass production; and (ii) the 'biological insurance' offered by the presence of redundant species in ecosystems, for instance by degrading pollutants.

The second paper in this part contains the following interesting insights regarding how economists and biologists typically relate to one another in studying ecosystem preservation: 'Economists and biologists usually do not work well together partly because they are professionally predisposed to be more than a little critical of the ideas expressed by each other on boundary area issues. Economists are pictured as moral morons and free market ideologues by biologists, and biologists are seen as social morons and statist ideologues by economists'. The author argues that economists' emphasis on monetary values and market mechanisms risks marginalising them as productive participants in the management of ecosystems. Nevertheless, he recognises that any rational environmental policy should involve attaining objectives in the most effective manner, an area where economists have much to contribute. Part 1 of the book also includes case studies of ecosystem services provided by Australian savannas and Mexican forests, as well as a paper focusing on integration of ecosystem services into environmental law and on how legislation can contribute to creating information markets (presumably through litigation).

The second part of the book is concerned with 'The capture and distribution of ecosystem service values'. It contains four papers on valuation of ecosystem services. As a group, these papers include a brief but competent review of the following issues: market failure, including externalities; non-market valuation techniques; and the nature of sustainability. They also present case studies and mathematical models that may be of use to researchers and graduate students working in this field.

The third part of the book, 'The path to sustainable development: the knowledge revolution', consists of a single paper that I found aggravating. The paper, written by G. Chichilnisky, starts on the wrong foot by informing the reader that the term 'knowledge revolution' is a registered trademark of the author. This is hardly the stance I would expect of a scientist concerned with sustainable ecosystem management. The author presents a vision 'of a global economy which is very innovative in the use of knowledge but conservative in the use of resources'. Although this is a good start, the paper degenerates into a poorly organised set of ideas, and becomes repetitive. Furthermore, it does not succeed in its goal of 'knitting together several issues into a coherent whole'. The paper's main policy contribution involves a proposal to create new institutions in the form of licenses to use knowledge.

However, the exposition is vague; it is not clear how such institutions would operate, nor how they would help developing countries to bring environmental degradation under control.

The fourth part of the book, entitled 'Synthesis and future directions', contains four papers. Topics covered include prospects for capturing ecosystem services. Much of the emphasis here is on water and watersheds, but attention is paid also to carbon sequestration; bio-control and pollination services; waste treatment; and storm and flood control. The place of markets in achieving sustainability, and the thorny issue of discounting, are also covered. There is also an intriguing paper on industrial ecology.

The fifth and final part of the book, 'A view from the South', comprises a collection of papers by a small group of South American authors. Although this section covers some of the basic issues discussed previously in the book, it serves to highlight particular aspects of these issues relevant to the South (referring to developing countries in general). The best contribution of this section of the book is to draw attention to corruption and poverty as factors that contribute to environmental degradation and present obstacles to the implementation of effective policies for land conservation.

In summary, the book contains a few papers offering useful insights for resource and environmental economists. It is not the sort of book to be read in its entirety or used as a textbook. Although it becomes long-winded and repetitive at times, it may prove instructive to researchers and graduate students.

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Restructuring Global and Regional Agricultures: Transformations in Australasian Agri-food Economies and Spaces, edited by David Burch, Jasper Goss and Geoffrey Lawrence. Published by Ashgate Publishing, Aldershot, UK, 1999, pp. xix + 320, ISBN 1 84014 975 2, hardback, US\$84.95.

This collection of contributions to the Fifth Annual Conference of the Agri-food Research Network of Australia and New Zealand is arranged in four parts. The parts deal, in turn, with the dynamics of globalisation; restructuring; policy and politics; and theorising concepts in agri-food research. The 31 contributing authors are mainly academic staff and/or postgraduate researchers within institutions belonging to the Network.

In all, there are 19 chapters in the volume. The disciplines represented are primarily rural sociology, anthropology and political economy. The tenor of the book is set by the opening chapter on 'virtual capitalism' by McMichael

of Cornell University (the only researcher based outside the region) which critiques globalisation from a political economy perspective. It traces the development of Western capitalism from the British-centred world economy of the late nineteenth and early twentieth centuries, through the Bretton Woods era, to a global economy that has supplanted national markets with a free trade regime favouring the operation of (mainly USA-based) transnational corporations. Cases are cited from around the world to illustrate the current form of politicised market rule: structural adjustment policies, the NAFTA and the 'import complex' of the post-industrial north. Finally, McMichael re-interprets recent phenomena such as the revival of sharecropping, the spread of contract farming and the increased employment of women in agriculture as 'a condition of, and conditioned by, the attempt to elaborate a politicised form of market rule on a global scale'.

Succeeding chapters in Part I discuss issues of globalisation. Nestlé's brand strategy is used to illustrate how multinational firms manage their intangible assets – both local and global brand names – to take advantage of favourable finance and tax conditions. In another chapter, the sustainability concept in New Zealand apple production is investigated to illustrate the spatial variation in its political, economic, social and environmental components.

Organic food production is targeted in two chapters. Campbell and Coombes readily dismiss consumer preferences as an explanation for the growth in organic agriculture, suggesting that this development has been structured by corporate agribusiness in order to overcome the political dynamics of 'green trade protectionism'. Such a structuralist analysis would be more appealing and persuasive if it were applied to genetically-modified foods, but this topic is strangely absent in the volume. In Monk's view, in contrast, consumer demand for organic produce is perceived as a main driver of the expansion in organic production, together with subsidy initiatives. Among the 'peripheral' drivers identified are the dissemination and adoption of sustainable production techniques, and the rise of ethical trade practices.

Burch and Goss document the rise of the USA-dominated fast-food sector in South-East Asia and assess the impact of the 1997–98 currency crisis on the Australasian agri-food sector. The account is informative, easily accessible to an agricultural economist and is refreshingly cautious about interpreting boom and bust in the sector as a type of South-East Asian Fordism.

In Part II, Russell and Campbell provide a fascinating review of the history of New Zealand/Mori fishing politics. Higgins gives an illuminating account of the policy shifts since 1997 towards a market orientation in Australia's Rural Adjustment Scheme, primarily from a political economy perspective. The role of the state is examined again in Schick and Liepins' account of how

agricultural training in New Zealand has shifted towards meeting market-driven needs at the expense of satisfying equity and access objectives.

Morris' discourse on mergers in the dairy industry in New Zealand provides a revealing study of social conflict within the agri-food sector. She shows how transformation of agribusiness structure as a result of the mergers led to the separation of the local economy from the geographically-based concept of community, and how an ethic of competition supplanted economic cooperation.

In Part III, the focus shifts to agricultural policy and politics, with a descriptive account of the evolution of the New Zealand Meat Board from a sectoral to an industry body. Then Baldwin's exposé of concerns about Stolle hyperimmune milk draws critical attention to agribusiness firm strategies that obscure important ethical and environmental issues affecting food safety, traceability and accountability. Blunden and Bradshaw document how agricultural support policy changes have effected a reduction in the use of synthetic inputs on New Zealand's fertiliser-dependent pastures, contributing both to environmental improvements and possibly long-term social and economic decline of pastoral systems.

Fitzgerald and Wilkinson's account of the management response to the accidental early release of the calicivirus agent for biological control of Australian rabbit populations seems parochial initially. However, it offers some general lessons about conflicting interests of stakeholders within the agricultural sector that would be instructive to those concerned with the management of diseases such as bovine spongiform encephalopathy (BSE) and foot-and-mouth. This part of the book also contains some interesting insights by Finemore and McAllister regarding the arrangements for contracting between mills, harvesters and growers in the Australian sugar cane industry.

The final part of the book contains disparate and uneven chapters on concepts in agrifood research. These are concerned with 'theorising consumption', focusing on beef; Marxist analysis of contract farming in the wine industry; group-based extension in the Australian cotton industry; and, finally, the meaning of sustainability for the Australian sugar industry.

Traditional agricultural economists wanting to see what lies outside the neoclassical box will be challenged by the 'new political economy of agriculture' and other approaches applied in this volume. However, the language is sometimes obscure, and 19 chapters proved indigestible to this reviewer. Nevertheless, fresh perspectives on the phenomena of concern to agricultural economists are undoubtedly useful. The book serves to remind us that, beside its business and economic dimensions, globalisation of the agri-food sector has political and sociological dimensions that are culturally and geographically specific.

One general criticism I would make of the book concerns the heavy reliance in some chapters on description and on secondary data, particularly since it is the product of a research network and various PhD research programs in progress. I would point also to two omissions in its coverage of agrifood issues related to globalisation. The issue of genetically-modified foods, as already noted, is one which would usefully lend itself to a structural analysis. So, too, would international retailing developments within the agrifood sector. Maybe these topics will appear in the Network's next conference.

This book reveals insights into the way other disciplines tackle problems of concern to agricultural economists. For that reason, and to create interdisciplinary dialogue, it might be admitted to the shelves. Nevertheless, my guess is that it is unlikely to persuade many traditional agricultural economists and free-marketeers that the 'new political economy of agriculture, discourse analysis and post-structuralist methods' of these other social scientists are tools which shed much new analytical light on their areas of interest. Nor is it likely to divert them significantly from their own interpretations, which seem to be based on contrary starting assumptions about market mechanisms and 'economic efficiency'. For that reason it might stay on the shelves.

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The Biotechnology Revolution in Global Agriculture: Invention, Innovation and Investment in the Canola Sector, edited by Peter W.B. Phillips and George G. Khachatourians. Published by CAB International, Wallingford, UK, 2001, pp. xi + 360, ISBN 0 85199 5136, US\$100.00.

The title of this book is misleading if you were expecting a comprehensive explanation of the 'Biotechnology Revolution in Global Agriculture'. Likewise, if you were anticipating a review of the canola sector in the true global sense. Nevertheless, while the focus is largely on Canada, the book presents an original and comprehensive description of invention, innovation and investment in the canola sector that is relevant to all developed countries. Being a result of the combined effort of researchers from Agricultural Economics, Applied Microbiology and Food Science and the College of Commerce, University of Saskatchewan, the book provides a mix of biological, economic and policy components. It is divided into six parts. Part 1 provides an introduction and overview, Part 2, insights into innovation, adoption and canola in general and Part 3 details public and

private sector involvement in the canola industry. Part 4 explains regulating biotechnology-based growth, Part 5 identifies gains from research and Part 6 outlines policy implications.

The subject of this review relates to the economics discussed in Parts 3, 4 and 5 as outlined above. The reasoning for this abbreviated review is not because the rest of the book is of little consequence. Rather, these Parts detail important and original contributions to knowledge that are of greater interest to the general readership of this journal.

Part 3 deals with public and private parties involved in the canola industry and how and why different institutions and contracts have evolved and changed with time. The theory behind the new institutional economics framework is clearly explained as a prelude to the 'institutional story of canola'. Although focusing on Canada, this story is presented as an excellent example of how institutions that deal with canola research have changed from largely governmental to almost wholly private. It is concluded that new institutions did resolve market factors that arose such as market development, product research, seed quality and variety availability. Nevertheless, Canadian farmers could have obtained greater financial success had they been fully aware of the processes occurring, because they could have captured a greater share of the available rents associated with this development. Therefore, to ensure that sectors involved in research and development are not disadvantaged due to lack of knowledge, this section explains the importance of understanding the supply chain, intellectual property rights, segregation and quality assurance, location and management of research and production and who will be in a position to capture economic rents.

The role of regulation in the canola market and a general theoretical overview into regulation is dealt with in Part 4. Detailed explanations concerning intellectual property rights and the importance of the regulatory system for discovery, production and marketing of canola are well thought out. Furthermore, descriptions of regulatory systems in the USA, the European Union, Canada and Australia, as well as issues associated with freedom to operate, provide an insight into innovation development in the canola industry. The importance of product approval and product acceptance are also highlighted. Such information helps to explain why consumers lack knowledge concerning transgenic canola. Following on is a detailed, but easily understood synopsis on international trade in knowledge-based products with specific emphasis on canola. However, some parts, especially those dealing with regulating discovery, are duplicated in this section.

Part 5 concentrates on gains from research. The description of the theory and methodologies relevant to evaluating these gains would be of

specific value to those involved with plant breeding, but also useful to all researchers who have to justify their research expenditure. The relationship between private investment, intellectual property rights and returns to research for all parties along the supply chain are examined. It is justifiably observed that there is a need for a closer examination of research policy in the biotechnology industry to ensure that there are net social benefits.

Each part of the book is descriptive and easily understood so that limited prior knowledge regarding the subject is required. Detail is extensive but well organised so that the reader can find specific information if required without having to negotiate the whole text. Such readers, or those inhibited by the relatively high price of the book, would benefit from borrowing it from a library. Alternatively, those specifically interested in canola, plant breeding, biotechnology and/or economics pertaining to these topics should consider purchasing this text.

The authors, who are global innovators in this research, were determined to present this complex investigation as an 'appropriate mix of science, society and the market'. We believe that they have been successful. As a final word, while the economic theory used to explain the development in the canola sector up until now fits well, time will tell whether this continues to be the case, especially with topics such as 'the impact of location on production'.

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