Technologists tend to be associated more with practice than research and should be studied in much the same way as engineers.

To this reviewer at least, the comments in the report about the exclusion of women from computers and computing are somewhat surprising in the light of his experience. The access situation in Australia may indeed have improved since the report was written although, on the other side of the coin, the information 'revolution' is continually changing the ways in which science, engineering and technology are 'done'—and not always for the better as far as the numbers of those employed are concerned. This issue needs re-examination.

The Advisory Group recognizes that there are education, training and employment issues that affect all women, and discusses these 'generic' ones in its report. This serves to underline the holistic policy approach it has taken to the main issues and recommendations. The report does not, however, discuss the reasons why the medical, legal and accounting professions have—over the last two decades—been successful in attracting significantly increased numbers of women practitioners and researchers. Nor does it discuss role models or success stories within SET.

Lastly, just a few words about equity and justice. The thrust of the Advisory Group's report is in these directions and, although the Group's recommendations are designed to advance both, they remain under-examinated by the end of it. But both, as concepts, are seen very much in the eyes of the individual beholders who will—in the last analysis—make the decisions.

I hope the new Minister has established the recommended WISET Unit and put it to work.

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The Environmental Imperative: Eco-social Concerns for Australian Agriculture

Frank Vanclay & Geoffrey Lawrence

Rockhampton, Australia, Central Queensland University Press, 1995, xxvi + 203 pp., AU$19.95
ISBN 1 8759 9800 4

'The environment has suffered more neglect at the hands of social scientists than any comparable subject' claimed Michael Redclift. With this claim being highly admissible, it is to be celebrated that *The Environmental Imperative* is a move towards the expansion of the sociologist's task, while also adding timely input and advice to the debates surrounding the nebulous topic of sustainable land use in Australia.

The authors open by claiming that 'Australian agriculture, in the mid-1990s, remains in crisis ... [while] Current thinking appears inadequate to the task of understanding the real nature of environmental problems within Australian agriculture' (p. ix). Vanclay and Lawrence have offered not only a critique of such thinking, but also have pointed to the ways in which their own discipline of sociology may play crucial future roles in reshaping both thinking and practice involved in the agricultural and scientific research industries. Readers take note: this text is far from singly applicable to sociologically minded scholars but reaches out to challenge the range of researchers, policy makers, bureaucrats and teachers whose fields transect in one way or another agricultural activities in Australia.

The authors bring together a formidable range of experience in the realm of

agricultural analysis, rural sociology and political economy of both Australian and global agro-food systems. Both have worked jointly on a number of publications in this general area of food, agricultural and extension policy and rural sociology. They are both extremely well placed to offer a critical and hard-hitting examination of the state of Australian agriculture in the 1990s—where it has come from, what presently drives it, and what major issues are facing it in the near future. The book offers an excellent introduction, with extensive references throughout, to the social and physical nature of land degradation in Australia. This is combined with a brief foray into some explanatory frameworks available through the rural sociological lens. These approaches inject a social flavour to the task of finding solutions to the environmental imperative facing Australian agriculture. The writing style is succinct and easily accessible for both the novice and the undergraduate of the many disciplines implicated in studying land use activities in Australia. The only aspect that detracts from the overall utility of the book is the confused and unworkable indexing which often does not correlate with stated page numbers.

The book firstly launches into an introductory overview of the physical and political-economic problems facing Australian agriculture in the 1990s (some 50-plus pages). There follows an exploration of research carried out on scientist and farmer attitudes towards the new biotechnologies and their likely impacts on agriculture in Australia. By comparing and contrasting these different social group views (which in the case of biotechnology seem to differ markedly in the status given to biotechnology's ecological attributes), Vanclay and Lawrence conclude that 'we appear to have ... a classic case of the development of a technology without any involvement from the end users of that research' (p. 70). Using biotechnology to highlight such issues, they warn that this approach is likely to lead to a (not uncommon) situation where there may well be a slow adoption of new technologies and techniques, whatever the scientific status and physical benefits which such technologies may otherwise bestow on the environment. The remedy?—to get the scientific research equation balanced in such a way that involves all the major stakeholders in the game. Extension, traditionally defined as the practice of bestowing technical advice and information to farmers, is highlighted by Vanclay and Lawrence as the ideal vehicle to achieve exactly this.

The above observations set the scene for delving into a critique of present extension practices in agriculture. Extension practice comes with a myriad of theories which describe its practice in both the real and theoretical worlds—from centralised transfer of technology (ToT) approaches, to more indigenous technical knowledge approaches to technological innovation and diffusion. Both the failures as well as virtues of extension are looked at. While the authors acknowledge that extension has traditionally been the message carrier of a less than sustainable agriculture to Australian farmers, there are still virtues in the state run form of this service. In a time which has seen large cutbacks to state run agricultural extension services, Vanclay and Lawrence argue that there are now large gaps in the facade of moving towards a more ecologically attuned agriculture. The move towards partial and total privatisation of both agricultural research and extension has exacerbated the seemingly unresolvable tensions surrounding common pool resource use and the wider ecological impacts of individual producer behaviour. While old models of centralised, top-down approaches to extension should rightly be treated as archaic and passe, throwing out the proverbial baby with the (blue-green) bath water seems at best regressive, and at worst only likely to further the environmental land and water problems that have developed throughout this century. Vanclay and Lawrence solidly state throughout their work that an active state arm is an essential feature of a sustainable and ecologically attuned Australian agriculture. This presence needs to be felt not only at an

extension level and in the education of farmers, but also at a regulatory and incentives creating level for there to be significant progress in this field. This public good approach to land management and resource use is a welcome breeze amidst the mostly stale and stagnating debate that has ensued over environmentally sustainable development and agriculture in the past few years.

With extension similarly in a state of crisis—of a fiscal, legitimation and theoretical nature—such calls for a rethinking and modification of its precepts and practices is equally welcome and timely. The authors argue that greater awareness, and therefore research, is required in areas such as scientist attitudes towards present research privatisation moves, farmer attitudes towards extension efforts, and farmer acceptance of leading ecological and scientific understandings of the environment. These social views are at least as important, the authors impress, as the inherent science behind them. Indeed, much research runs the risk of being rejected, like the biotechnology applications mentioned previously, if there is not a social component of understanding within the technical terrain of innovation and diffusion of technologies. Such social aspects would include the understanding of social constraints under which farmers may operate, group processes and their impact on acceptance of ideas and practices, the role of women in farm decision-making, and the range of intangible and hard-to-measure social, political and economic constraints impacting upon adoption or rejection of specific technologies.

Taking on a social research perspective in agriculture Vanclay and Lawrence would have us believe, if well designed and focused, is likely to improve vastly the efficiency and effectiveness of agricultural policy aims, while raising awareness of problem areas and pointing researchers and policy designers in the most appropriate directions. For instance the authors cite a 57% awareness level among farmers towards the presence of salt tolerant plant species and their correlation with soil salting. Such a low level of awareness, if left unchecked, would likely have detrimental effects on most technical and policy measures designed to prevent soil salinity while encouraging practices to reclaim saline lands. Increasing both social research and social awareness components of our agricultural science and technology base would strengthen the scientific, policy and extension components aimed at instituting a more ecologically sustainable and less land-degrading agriculture. Getting the social back into the science is the well overdue and desperately needed requirement which Vanclay and Lawrence continuously return to.

Amidst a recent sea change which is now unforgiving to views which harp on government expenditure and help, the views promulgated by Vanclay and Lawrence may seem somewhat out of vogue. Indeed they are. However, such points as are made by the authors need re-emphasising in a period which has become fanatical about outsourcing, privatisation and individualising of ecological and economic problems. By challenging these presently held cultural and institutional assumptions regarding land management, the authors add to the debate in the classic and traditional ways in which academic scholarship is expected to perform—as observers who are not necessarily beholden to agribusiness interests, nor bound by government institutional groupthink which is presently enraptured by such activities. The call for integration and increased support for sociological research in agriculture similarly seems a voice in the wilderness which is much in need of hearing, although still a strangely foreign idea in many policy and bureaucratic circles.

The host of land use discussions going on such as the recent Industry Commission inquiry into sustainable land and water management, and the ongoing mooting of optimal water and land rights legislation, are part of an ongoing tradition within Ecologically Sustainable Development (ESD) debates that have now stretched across

more than a decade in Australia. The placing of the social elements of the ESD debate on centre stage is well overdue in the discussion over sustainable land use, the sustaining of rural economies and societies, the appropriateness of landcare initiatives and the carving up of the bounteous National Heritage Fund made available through the partial sale of Telstra. Vanclay and Lawrence have shed much needed light on the subject area of land use policy from a sociological perspective, and have set the challenge for policy makers, agricultural and other bureaucrats, researchers, regulators and teachers to integrate social realities into what has still to date been a very technical and physical terrain of ESD discussions and policies.

The Environmental Imperative manages to launch a range of challenges both at a researcher and teacher as well as a policy level. In terms of policy, the book is quite scathing in its attack on the demise of the culture of state intervention and support for the agricultural sector. The authors argue vigorously for the reinstating of state-backed (but modified) extension services, as well as rural social and technical schemes which encourage community and individual farmer movements towards more sustainable land use practices. Harking to the calls for more sociologically informed scientific, policy and extension staff training would go some of the way towards changing present agricultural practices from the top level down, the authors argue.

The specific area of rural sociology and its relationship to extension science is comprehensively, if necessarily fleetingly, dealt with. A manifesto of possible future research priorities as well as challenges to the field are laid out. Of highest importance is the need for researchers to 'study farmers on farmers' terms' (p. 169) in order to increase the 'usefulness, validity and effectiveness of the research and extension process' (p. 172). Such calls, if heeded, are likely to prove as radical and far reaching in the changes that would ensue to agricultural science as are required and called for in the practice of agriculture itself. One can only hope that books like this one play the significant role they deserve in the reorienting of Australian agriculture and science towards real, as opposed to virtual, ecologically sustainable land use.

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The Trouble with Computers: Usefulness, Usability, and Productivity

Thomas K. Landauer

Cambridge, MA, MIT Press, 1995, x + 425 pp. US$27.50 (hbk), ISBN 0 262 1 2186 7

This book sets out to promote an approach to the design, development and deployment of computer systems which is intended to overcome current shortcomings in the usefulness and usability of such systems. Landauer uses his book to set an explanation and justification of his approach in the context of the so-called 'productivity paradox'. In doing so he produces a valuable and comprehensive review of the literature addressing the evident gap between investment of time and money in computer systems and any corresponding improvement in organisational performance. Landauer's remedy is presented as 'User Centred Design' with its necessary counterparts of user centred development and user centred deployment and in justifying and explaining this approach he draws upon a wide range of literature describing experimental research and industrial experience.