8 Environmental policy for environmental outcomes

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Abstract

In order to generate real environmental improvements in a cost-effective way, environmental policy programs need to have a number of characteristics. Among other things, they need to: (a) draw on good-quality scientific technical information about environmental degradation, and about the links between actions and environmental outcomes (b) account well for the behavioural responses of land and water managers to policy interventions (c) prioritise investments well, consistent with an appropriate role of government (d) select realistic targets that can drive good monitoring and evaluation (e) select policy mechanisms that are appropriate for the circumstances (f) strike an appropriate balance between mitigation and adaptation (g) account for negative side-effects of proposed environmental management actions.

Environmental managers need to be encouraged by program rules and procedures to pursue environmental outcomes cost-effectively. Recently completed national programs, the National Action Plan for Salinity and Water Quality, and the Natural Heritage Trust, fell short on all of these criteria. Improving matters will be difficult for reasons that include capacity constraints in government agencies and time pressures on policy development. Some alternative directions for environmental policy are discussed, including a stronger reliance on market-based policy instruments.

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8.1 Introduction

This paper summarises a number of features that environmental policy needs to have if it is to deliver environmental outcomes cost-effectively. The discussion is illustrated using two major national environmental programs that came to an end on 30 June 2008: the National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust (NHT).

Background to NAP and NHT

The two programs were largely delivered through 56 regional natural resource management bodies, which I will refer to as Catchment Management Organisations (CMOs). Billions of dollars from the Australian Government were provided, conditional on matching funds being provided by State governments, CMOs were responsible for developing and implementing integrated regional plans for environmental investment. They appointed their own staff, but also relied on community participation and support by State government agencies. The approach was intended to be based on the idea of Integrated Catchment Management, where managers plan and prioritise, based on a detailed consideration of physical, biological, economic and social information.

The two programs have been widely criticised. In my judgement, they were not very effective in achieving environmental outcomes. Many of the projects funded within these programs will have little enduring environmental benefit. In my view, their poor performance was easily avoidable using knowledge that existed at the times they were established. Problems with program design and implementation were pointed out in commentary at the time (e.g., Pannell 2001a, 2001b) and subsequently raised in a number of official enquiries (Auditor General 2004, 2008; SSCECITA 2006; HRSCSI 2004; SKM 2006). There were no substantial changes to the programs in response to these enquiries. Key issues determining the effectiveness of such programs are discussed in subsequent sections.

Use of scientific technical information

Environmental problems are often technically complex and uncertain. Sound decisions about their management need to be based on good knowledge about (a) the degree of threat or damage to environmental assets at risk, and (b) the extent to which this threat or damage can be reduced by particular changes in management. In many cases, generic knowledge about an issue is not sufficient — we need locally specific knowledge.

The NAP and NHT programs did not require CMOs to make good use of scientific information when formulating their investment priorities and plans. In general, CMOs did account reasonably well for threat or damage, but with very few exceptions they did not use adequate information about the link between proposed actions and environmental outcomes. They were not provided with technical support to do so and they were not required to demonstrate that they had done so in the course of their plans being accredited by government. Concerns about lack of science in the programs were identified repeatedly in the various enquiries and reviews commissioned by government. For example, it was highlighted that decisions should be 'based in sound, up-to-date science' (SSCECITA 2006, p. 221); that in dryland areas, 'Links between actions and resource condition change … are often not confidently quantified...' (SKM 2006, p. 1); and that 'NAP/NHT have only been partly successful in enabling the flow of scientific and technical information into the catchment management planning process' (Chartres et al. 2004, p. 4). Furthermore, CMOs were highly constrained by the programs in their investment in research to collect missing information required for sound decision making. Funding was expected to be spent on 'on-ground works'.

Use of socioeconomic information

If the works or changed practices needed to protect an environmental asset require changes in behaviour by private land or water managers, investment managers need to consider whether those works will be attractive or unattractive to the people who would have to adopt them. There are many well understood reasons why conservation practices can be unattractive to land and water managers (Pannell et al. 2006). If the practices are highly unattractive in a particular case, it will be expensive and difficult to get them adopted, and the viability of investing in that environmental asset will be reduced. It is important to appreciate that, even if the works are relatively attractive when implemented at small scale, they may be highly unattractive at large scale.

Seymour et al. (2008) found that CMOs have little capacity in the use of social or economic information relating to landholder behaviour. The programs did not provide carrots, sticks or support to fill this gap. 'Additional attention needs to be directed to issues associated with farm economics and profitability in natural resource planning' (Chartres et al. 2004, p. 3). In general, the likely response of landholders to interventions was not considered in any depth, if at all. At national, state and regional levels, it was generally naively assumed that, with sufficient effort and skill on the part of extension agents, landholders would respond on an adequate scale to extension and the payment of small, temporary grants. The fact that they often did not do so could readily have been foreseen. Pannell (2001b)

highlighted the fact that in many regions there was a lack of sustainable land-management practices that were readily adoptable by farmers. Pannell et al. (2006) argued that 'If such innovations cannot be identified or developed, there is no point in falling back onto communication. Promoting inferior practices will only lead to frustration for all parties' (p. 1421). That did occur very commonly.

Appropriate prioritisation of potential projects

There is a strong tendency for environmental programs to attempt to achieve too much, allocating too few resources to too many projects. The projects they do fund tend to be of widely differing merits. Some of the investments receiving funds are worthwhile, and some are not worthwhile at all. Given that project budgets are generally very small relative to levels that would be required to manage environmental degradation comprehensively, the need for tight and careful targeting of investments is obvious.

The highest priority environmental investments should have at least these four characteristics: they should relate to (a) particularly valuable environmental assets; (b) facing threatened or current high degradation; (c) with high feasibility of reducing that threat or degradation at reasonable cost; (d) with the required works being reasonably attractive to relevant land or water managers. If even one of these elements is neglected, there is a high risk of selecting poor investments.

In the NAP and NHT, no consistent framework for planning and prioritisation was provided to CMOs. Each developed its own approach and, not surprisingly, there was wide variation between regions in the approaches used. I have been unable to find any region with a prioritisation framework that I would rate as 'good'. Indeed, very few would rate better than 'poor'. There are hardly any assets funded under the two programs for which all four of the above required characteristics were assessed in any depth.

Again, this deficiency was recognized in official enquiries, but not redressed. 'Close attention must be paid to … actively encouraging regions to put in place measures that are well targeted' (Auditor General 2004, p. 15). It was recognized that investment decisions should be 'outcome focused' and 'subject to a cost-benefit analysis' (SSCECITA 2006, p. 221).

Good prioritisation requires good information and good analysis, which takes time. Programs need to be run with the patience to allow this to happen. In the NAP and NHT, CMOs were under severe time pressure to complete their planning processes and commence spending the money, irrespective of the quality of those plans.

Ridley and Pannell (2005) developed an investment framework for salinity (called SIF3) which explicitly addresses all four characteristics. The Senate Standing Committee on the Environment, Communications, Information Technology and the Arts (2006) recommended that governments should 'keep a watching brief' on our framework, 'with a view to potentially implementing it (or a modified version of it) across the country' (pp. 229–30).

Balance of investment between current works and technology development

'For some environmental issues, the real challenge is to find or develop innovations that are not only good for the environment, but also economically superior to the practices they are supposed to replace' (Pannell et al. 2006, p. 1421). In my view, this is underrecognised, including by economists. If economists do consider innovation, we tend to take the view that the right policy settings will foster innovation among polluters, resulting in the creation of lower-cost methods for pollution abatement. This may work for some sorts of pollution, but for the sorts of environmental problems covered by the NAP and NHT (often highly diffuse or dispersed problems caused by many small businesses), we cannot expect that they would be able to develop the sorts of new land-use options that would be required. The task would require research on a scale, and with a level of expertise, that is far beyond any individual or group of farmers. The NHT program made a minimal investment in this area, and the NAP made no investment that I am aware of.

Again, the need for more investment in this area was well recognised in official enquiries but not acted on. 'Limited availability of commercially attractive treatment options for regions [is a] key risk that require[s] careful management' (Auditor General 2004, p. 14). 'The Committee recommends that the Australian Government give greater emphasis through its investments in salinity science to develop new, economically-viable land and water use systems' (HRSCSI 2004, p. 167).

Balance of investment between mitigation and adaptation

Where mitigation is not justified on benefit-cost grounds, there may be net benefits in investing in adaptation to a degraded environment. This becomes particularly important in problems like dryland salinity and climate change, where much degradation is physically impossible to avoid, and where even more degradation is not economically efficient to avoid. In the original NAP program documents, the focus was entirely on mitigation. Although there were eventually some investments

in adaptation, the appropriate balance between the two was never, in my view, properly considered.

Use of appropriate policy mechanisms

Pannell (2008) shows that the best choice of policy tool depends on the mix of public and private net benefits from proposed changes. Therefore the choice of policy mechanism needs to be sensitive to local conditions, as well as to the general characteristics of a problem. In the NAP and NHT programs, the great majority of funds were spent on extension and small temporary grants. As argued earlier, these were often used in circumstances where they could not deliver environmental outcomes, often because they were used to promote conservation practices that were not adoptable. Investors should either have used different policy mechanisms or taken no action.

Avoidance of adverse side-effects

In some circumstances, works undertaken to improve one natural resource problem can have negative consequences for another. For example, many trees were planted with the intention of reducing saline discharge into rivers, but in circumstances where they had a more important negative impact on the yield of fresh surface-water into the same rivers (for example, Nordblom et al. 2006). Because the NAP and NHT programs did not deal adequately with the science of cause and effect, this was largely unrecognised by CMOs, who provided payments to encourage some actions that should have been discouraged.

Monitoring and enforcement of compliance

In circumstances where the preferred conservation practices are attractive to landholders, CMOs do not need to use incentive-based mechanisms to encourage adoption, and consequently they do not need any enforcement mechanism. But where an incentive mechanism is used to compensate for the negative private net benefits of a conservation practice, or to prevent adoption of an environmentally-damaging practice that is attractive to landholders, monitoring and enforcement needs to be part of the program. NAP and NHT had little monitoring and, as far as I am aware, no mechanism for enforcing agreed changes in land management, other than refusing to extend payments to a second phase. In practice, even this option was not always used. I am aware of cases where landholders received an incentive payment to adopt the same practice three times, but gave it up each time.

Setting appropriate targets

Environmental targets should be consistent with the known biophysical information about the asset's response to management, the known behavioural responses of land and water managers to policy interventions, and the resources available under the program. Clearly, you cannot select such targets unless you have undertaken high-quality analysis of the investment options. In the NAP and NHT, the program required CMOs to specify targets, but did not require those targets to be in any way realistic. Indeed, in some ways realism was discouraged within the guidelines imposed. Not surprisingly, '80 out of the 163 resource condition targets identified in the plans [of eight regions examined] did not meet the identified criteria in terms of being measurable or having a specific timeframe' (Auditor General 2008, p. 19).

The lack of realistic targets also infected the high-level goals of the programs: 'The consensus, from consultations during the course of the audit, indicates that [it] will not be possible [to meet the program goal to stabilise or reverse salinity trends] within the eight-year timeframe originally envisaged for the NAP' (Auditor General 2004, p. 18).

Monitoring and evaluation linked to management

Good evaluation is closely related to good planning. If the analysis has been done to select investments and establish high-quality targets, monitoring and evaluation is relatively straightforward, and results can feed into ongoing management decisions.

Many CMOs did not understand how to undertake monitoring and evaluation so that they provided sound and useful data for evaluation and ongoing management (SKM 2006). The programs did not require them to do so. Monitoring in NAP and NHT focused on accountability for funds spent, but neglected the achievement of environmental outcomes. This focus sent a message to CMOs that the government was not really concerned about the achievement of outcomes, only with spending the money. Weakness of monitoring was also observed at the program level: 'At the present time it is not possible to report meaningfully on the extent to which these outputs contribute to the outcomes sought by government' (Auditor General 2008, p. 16).

Supporting and creating appropriate incentives for environmental managers

In a program where decisions about actual investments are devolved to individuals or groups separate from the funding body, it is important for the funding

arrangements to be set up in a way that provides incentives for environmental managers to seek environmental outcomes cost-effectively. Programs should also provide support to address important knowledge and skill gaps that managers may have.

As we have noted above, NAP and NHT provided inadequate support: 'enhancing guidance to the regions must be given a higher priority' (Auditor General 2004, p. 15). They also provided almost no incentives for CMOs to pursue environmental outcomes. Targets were not required to be realistic, and accreditation of plans was very weak, particularly in relation to their use of science and socio-economic information. The Senate Standing Committee on the Environment, Communications, Information Technology and the Arts (2006) recommended that Government should 'strengthen the accreditation process for regional bodies' and 'ensure that funding is conditional on rigorous investment planning' (p. 221).

Consistency with an appropriate role for government

Broadly speaking, government policy may seek to: (a) increase aggregate social welfare through reducing market failure; (b) protect or enhance publicly managed resources, (c) address areas of inequity, inequality or disadvantage; or (d) pursue political objectives to generate benefits to the government. In evaluating any program, I assume that item (d) is to be judged inappropriate. For the NAP and NHT, specifically, I believe that item (c) is of minimal relevance, although a very narrow and illogical view of the importance of equitable sharing of program funds pervaded both programs. The key issues here, then, are the extent to which the programs were targeted to addressing market failures, their success in reducing them, and their contributions to protection or enhancement of publicly-managed assets.

The main market failures relevant to the NAP and NHT programs are public-good problems (non-rivalry and non-price excludability) associated with externalities, or associated with information failures. For example, land management on one farm can cause negative externalities due to salinity affecting water resources, environmental assets, public infrastructure, or agricultural land on another farm. Information failures may arise, for example, if farmers are unaware of or have misconceptions about land management practices that would be in their interest to adopt.

Ostensibly, the NAP and NHT could be seen as targeting these market failures, through the payment of grants to farmers to internalise externalities, and the use of extension officers to promote changes in farming practices. But a deeper assessment reveals problems in both areas.

For an intervention to be judged as efficiently managing a negative externality, its overall benefits must exceed its costs. In the case of the NHT, there was no evidence that particular investments under the program would generate positive net benefits for the community. In the case of the NAP, there was evidence that they often would not. Benefits of managing salinity are often small and they may be highly localised (Pannell, McFarlane and Ferdowsian 2001). On the other hand, the costs of reducing externalities from salinity are often large, requiring very substantial changes in land management (for example, Dawes et al. 2002; National Land and Water Resources Audit 2001) and the recommended changes often have high opportunity costs (for example, Kingwell et al. 2003), especially when applied at large scale (Bathgate and Pannell 2002). Overall, the net benefits of acting to reduce salinity externalities would very often be negative. Identifying cases where they would be positive requires a detailed and sophisticated analysis. From the previous subsections, however, it is clear that the program did not include or support such analysis.

As noted earlier, most of the advocated salinity-mitigation practices in most regions are unattractive to landholders for economic (Kingwell et al. 2003) or other (Pannell 1999) reasons. This means that farmers' non-adoption of these practices does not constitute an information failure, and so use of extension to promote these practices is not justified on a market-failure basis.

On the other hand, some investments in direct action by government, such as pumping saline groundwater to prevent discharge into the Murray River (River Murray Water 2006), or pumping to lower saline water-tables under rural towns in Western Australia (Department of Agriculture 2004), seem much more likely to be justified on a benefit-cost basis. Unfortunately, investments of this type were the exception within the NAP and NHT, probably due to a view that they should be the responsibility of State governments. An assumption built into the program, presumably for political reasons, was that most funds should be directed to supporting land-use change on farms. It would have been better for the program to select policy approaches that were best suited to local conditions for particular environmental problems, rather than building in assumptions about the policy mechanisms to be used.

Capacity requirements of policy agencies

Policy officers designing programs for management of complex environmental problems should ideally have a good understanding of those problems and be able to draw on the scientific and socioeconomic evidence about their management. In my observation, the scientific knowledge used to design the NAP was superficial, based on a highly simplified and stylised understanding of the problem, and not

encompassing the latest relevant research. It did not involve effective integration of biophysical and socioeconomic information in the design of the program. I have found that many environmental policy officers in Canberra lack a deep knowledge of the environmental issues for which they are responsible. In part this is a consequence of the rapid movement of staff between jobs and agencies that is the norm in Canberra. I believe that this is a very serious and under-recognised problem. In my view, good quality environment policy cannot be developed by people who do not have very strong content knowledge.

A part of this problem is the time pressure under which policy officers typically operate. Policy development always seems to occur in an unseemly rush, which inevitably reduces the quality of the resulting policies. The rush could be reduced if agencies pre-emptively invested more time and resources in the sort of analysis required to make good decisions about policy priorities, before an existing program is concluded.

Alternative policy approaches

The programs discussed here involved partial devolution of responsibility to regional organisations with community membership. Planning and prioritisation was conducted by committees, and for on-ground changes they relied primarily on voluntary actions by landholders. I have indicated how a system of this broad type might be improved: through providing carrots, sticks and support to those regional organisations so that they have the incentive and the capacity to take the science and economics of the problems seriously, undertake better integrated analysis, target funds more tightly to high-payoff investments, use a broader range of policy tools better matched to particular circumstances, and so on.

One problem with this set of prescriptions is doubt about whether it is realistic at the bureaucratic level — about whether the government departments themselves have the incentive and the capacity to deliver the necessary reforms. It would also be a major challenge to change their cultures so that they give priority to the efficient achievement of environmental outcomes. With this sort of concern in mind, the late Peter Cullen proposed that an independent body be established with the responsibility for designing and overseeing the main environmental programs. This body would be more independent of politics than government departments are, and they would be judged strictly according to their achievement of environmental outcomes. I have some sympathy for this proposal.

Whatever happens at that organisational level, there is a question about the appropriate mechanisms to deliver change on the ground. Some economists argue that we should rely more on market-based approaches to improve the efficiency of

environmental investments. The NAP program did include a small pilot program for market-based instruments, and some CMOs have dabbled in the use of conservation tenders, but, overall, the more sophisticated economic policy instruments have been little used within national conservation programs. The leading proponent and practitioner of this approach has been the State of Victoria, under the encouragement and guidance of Gary Stoneham, now at the Department of Sustainability and Environment (for example, Stoneham et al. 2003). Economic policy instruments look likely to play a major and very positive role in Victorian conservation programs in coming years. The Victorian approach solves the problem of prioritising investment using good science and good economics. I do, however, have some observations about a potential national rollout of market-based approaches.

- The success in Victoria appears to rely very much on the high capability and determination of Gary Stoneham's group, and their strong influence on policy-makers. It is hard to see this being replicated in other States or at the national level. The sophistication of the approach is a great strength, but also a constraint on its broader application. Approaches that take short cuts on the underpinning analysis are unlikely to offer large improvements over more traditional approaches.
- Market-based instruments are not always the most appropriate response to an environmental problem. For example, the available conservation practices may be so unattractive to landholders that the prime need is to develop improved practices, or so attractive to them that extension alone is sufficient. Or, given the property rights regime in place, enforcement of a perceived duty of care may be required. Or for a specific environmental outcome, the population of landholders may be too small for a market to operate.
- Market-based instruments are just one tool within the class of incentive-based policy tools, and incentive-based tools are just one class of tool within the overall toolbox. In my judgment, the choice of the right class of tool (Pannell 2008) is more important than the choice of a specific tool within that class.
- Even if we do eventually move to a much stronger reliance on market-based approaches nationally, this is likely to take some considerable time. In the meantime, there is a pressing need to improve the institutions, the tools and the information used within the existing national system.

In response to our perceptions of the needs of environmental policy programs, Anna Ridley and I have developed INFFER (Investment Framework For Environmental Resources, see: www.inffer.org). It is strongly based on our experiences with SIF3 and includes similar principles, processes and frameworks. The aim is to ensure that environmental managers bring a benefit-cost analysis mindset to their consideration

of investment options. It is designed to be as simple as possible to use, but includes all of the key factors that need to be considered (as discussed earlier). It guides investors towards investment in assets with a high likely net payoff, and advises on the most appropriate class of policy tools to use. We have been promoting INFFER to governments and CMOs.

References

Auditor General 2004, *The Administration of the National Action Plan for Salinity and Water Quality Audit*, Report no. 17, 2004–05, Performance Audit, Australian National Audit Office, Canberra.

—— 2008, *Regional Delivery Model for the Natural Heritage Trust and the National Action Plan for Salinity and Water Quality*, Report no. 21, 2007–08, Performance Audit, Australian National Audit Office, Canberra.

Bathgate, A. and Pannell, D.J. 2002, 'Economics of deep-rooted perennials in Western Australia', *Agricultural Water Management*, vol. 53, no. 1, pp. 117–32.

Chartres, C., Stewart, B., Bowmer, K., Ryan, S. and Moore, C. 2004, *Scientific Advice On Natural Resource Management*, Report to the Natural Resource Management Ministerial Council by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Australian Bureau of Meteorology (BOM), http://www.nrm.gov.au/publications/books/pubs/scientific—advice.pdf (accessed 22 July 2008).

Dawes, W.R., Gilfedder, M., Stauffacher, M., Coram, J., Hajkowicz, S., Walker, G.R. and Young, M. 2002, 'Assessing the viability of recharge reduction for dryland salinity control: Wanilla, Eyre Peninsula', *Australian Journal of Soil Research*, vol. 40, pp. 1407–24.

Department of Agriculture 2004, 'Turning townsite salinity into a liquid asset', Rural Towns–Liquid Assets Project, Department of Agriculture, Perth. http://www.agric.wa.gov.au/content/lwe/salin/townsal/rtla_brochure_3.pdf (accessed 27 July 2008).

HRSCSI (House of Representatives Standing Committee on Science and Innovation) 2004, *Science Overcoming Salinity: Coordinating and Extending the Science to Address the Nation's Salinity Problem*, Commonwealth of Australia, Canberra.

Kingwell, R., Hajkowicz, S., Young, J., Patton, D., Trapnell, L., Edward, A., Krause, M. and Bathgate, A. 2003, *Economic Evaluation of Salinity Management Options in Cropping Regions of Australia*, Grains Research and Development Corporation, Canberra.

National Land and Water Resources Audit 2001, *Australia's Dryland Salinity Assessment 2000*, Land and Water Resources Research and Development Corporation, Canberra.

Nordblom, T., Hume, I., Bathgate, A. and Reynolds, M. 2006, 'Mathematical optimisation of drainage and economic land use for target water and salt yields', *Australian Journal of Agricultural and Resource Economics*, vol. 50, no. 3, pp. 381–402.

Pannell, D.J. 1999, 'Social and economic challenges in the development of complex farming systems', *Agroforestry Systems*, vol. 45, no. 1–3, pp. 395–411.

—— 2001a, 'Salinity policy: A tale of fallacies, misconceptions and hidden assumptions', *Agricultural Science*, vol. 14, no. 1, pp. 35–7.

—— 2001b, 'Dryland salinity: Economic, scientific, social and policy dimensions', *Australian Journal of Agricultural and Resource Economics*, vol. 45, no. 4, pp. 517–46.

—— 2008, 'Public benefits, private benefits, and policy intervention for land-use change for environmental benefits', *Land Economics*, vol. 84, no. 2, pp. 225–40.

——, McFarlane, D.J. and Ferdowsian, R. 2001, 'Rethinking the externality issue for dryland salinity in Western Australia', *Australian Journal of Agricultural and Resource Economics*, vol. 45, no. 3, pp. 459–75.

Pannell, D.J., Marshall, G.R., Barr, N., Curtis, A., Vanclay, F. and Wilkinson, R. 2006. 'Understanding and promoting adoption of conservation practices by rural landholders', *Australian Journal of Experimental Agriculture*, vol. 46, no. 11, pp. 1407–24.

Ridley, A., and Pannell, D.J. 2005, 'The role of plants and plant-based R&D in managing dryland salinity in Australia', *Australian Journal of Experimental Agriculture*, vol. 45, pp. 1341–55.

River Murray Water 2006, *Keeping Salt Out of the Murray*, Murray–Darling Basin Commission, Canberra, http://www.mdbc.gov.au/_data/page/105/SIS_ brochure. pdf (accessed 27 July 2008).

SSCECITA (Senate Standing Committee on the Environment, Communications, Information Technology and the Arts) 2006, *Living with Salinity — A Report on Progress: The Extent and Economic Impact of Salinity in Australia*, Commonwealth of Australia, Canberra.

Seymour, E., Pannell, D., Ridley, A., Marsh, S. and Wilkinson, R. 2008, 'Decision-making by catchment management organisations in Australia: Current processes and capacity gaps', *Australasian Journal of Environmental Management*, submitted.

SKM 2006, *Evaluation of Salinity Outcomes of Regional Investment*, Final Report for the Department of the Environment and Heritage and Department of Agriculture, Fisheries and Forestry, SKM, Bendigo.

Stoneham, G., Chaudhri, V., Ha, A. and Strappazzon, L. 2003, 'Auctions for conservation contracts: An empirical examination of Victoria's BushTender trial', *Australian Journal of Agricultural and Resource Economics*, vol. 47, pp. 477–500.