

Submission to:

***The Senate, Standing Committee on Rural and Regional Affairs and Transport***

***Inquiry into Natural Resource Management***

Submission by:

Professor David Pannell

ARC Federation Fellow

University of Western Australia

The numbering of these comments aligns with the Inquiry's terms of reference.

(i) **Lessons learned.** I refer to the attached paper, "Environmental Policy for Environmental Outcomes", which describes the key lessons from NHT and NAP and their implications for Caring for our Country.

(ii) **Building on knowledge and experience.** The attached brief paper "Delivering on the promise of Caring for our Country" spells out the implications of the past experience for the design and implementation of Caring for our Country.

(iii) **Costs and benefits of regional approach.** The regional approach has been an experiment. So far it has fallen well short of its potential. In my view this is primarily because of the lack of carrots, sticks and support from government for regional NRM bodies to seek cost-effective NRM outcomes. As a legacy of Landcare and NHT, and as a result of their explicit role as a bridge to the community, there is a strong embedded culture in most regional bodies that views a broad inclusive approach as being their primary agenda, with the achievement of real NRM outcomes being secondary. It will take a concerted effort from government to change this. At this stage there is no indication that such a concerted effort will be made within Caring for our Country. If this culture is not confronted and fundamentally altered, the performance of regional NRM bodies during the life of CfoC will be no better than it has been in NHT and NAP.

My research has shown that that performance (in terms of achieving high-value outcomes) has generally been low. Regional bodies lack capacity in the crucial areas of integration of information, in prioritisation of investments, in economics, in social science, and in some states they lack an ability to engage well with science. In most cases their prioritisation processes are very poor, particularly in relation to evaluating the feasibility of projects to deliver NRM outcomes (both technical and socio-economic feasibility). Most investments have been made with no serious assessment of the likely NRM outcomes.

My efforts to assist regions to apply a rigorous investment framework ([www.inffer.org](http://www.inffer.org)) have revealed that they need considerable practical and technical support and training to do this.

The Australian Government should have developed a standard NRM investment framework to underpin all public investments, and required and supported its application at regional and national levels. Regions have been left to make up their own approaches, with predictable results. In the absence of a government-developed framework, I have worked with colleagues to develop the INFFER framework ([www.inffer.org](http://www.inffer.org)) and have tested its application with several regional NRM bodies. It has worked well. It is likely that all regional bodies in WA will use INFFER for their assessment of projects in future. I propose that the Australian Government should adopt it as a national approach, or else develop their own

framework (although this would be unnecessary duplication given the existence of a tested approach in INFFER).

Although the regional system has not worked well so far, I believe that it could be made to work. But only if the Australian Government is serious about achieving NRM outcomes through the regional system and institutes the required carrots, sticks and support to change the culture, behaviour and capacity of NRM groups.

**(iv) The need for a long-term strategic approach.** This need is obvious. NRM outcomes often take considerable time to emerge following interventions, or sometimes there is a need for fundamental work to develop technologies, which also takes time. Programs need to have the patience to pursue those investments that will have the largest NRM benefits in the long term, not just in the short term. This is difficult to achieve when responsibility for programs rests with Ministers and Departments. One potential response to this problem (proposed by the late Peter Cullen) is to establish an independent body, something like the Reserve Bank, that would be responsible for the oversight of programs to achieve outcomes in the long term. This would be challenging to get political agreement on, but it may be the only chance to embed a long-term view into NRM policy decisions.

An illustration of the problem is the current transition year in Caring for our Country. This was an opportunity for government to really get its house in order, using the year to undertake high quality analysis of investment needs so that from year two the program could pursue NRM outcomes with confidence. This would have been an obvious component of a real “business approach”. However, instead of this the Departments have been placed under ridiculous time pressure to get the program rolling quickly, so that there is no time for careful analysis and thoughtful development of improved processes. At this stage it looks as if the result will be no better than NHT1, at least in the early years of the program. This is a tragic missed opportunity, and a great frustration to those of us who have laboured hard to provide the evidence and the tools for government to do a better job of NRM policy.

**(v) Capacity of NRM groups, especially in relation to Caring for our Country.** The capacity of many NRM groups was already low under the old policy regime (see point (iii) above). With the reduction in funding that they are facing, their capacity is clearly falling. In many cases experienced staff are leaving, due to the considerable uncertainty during this transition year, and apparent poor prospects. With the reduced funding, a larger proportion of their budgets will have to be spent on overhead costs. In the circumstances I think there is a need for some clear and unsentimental thinking about what the role of the regions really should be in the new policy environment.

**(vi) Is CfoC a comprehensive approach?** Clearly not. Its budget remains very small relative to the scale of the problems it is supposed to address. As well as this resulting in missed opportunities, it creates pressures for funds to be spread thinly again, which greatly reduces the chances of achieving worthwhile outcomes. On the other hand, it would be hard to justify a dramatic increase in resourcing of the program without some fundamental changes in the areas I have discussed above. Priorities need to be decided based on a sound investment framework, scientific and economic evidence about feasibility need to be taken much more seriously, and there needs to be patience so that there is time to get investment decisions right or to develop improved technologies where needed.

# Delivering on the promise of Caring for our Country

David Pannell, University of Western Australia

Anna Roberts, Dept. Primary Industries, Victoria

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Important features of the new Australian national program "Caring for our Country" include that:

- it will set clear national priorities,
- it will set benchmarks and report on progress annually, to improve accountability,
- delivery of large components of its new package will be contestable, with many organisations potentially able to bid to deliver. This could foster innovation and efficiencies in program implementation.

Overall, there is a commitment to learn from and not to repeat the mistakes of the NAP and the NHT. A number of implications flow from these features that will need to be built into the detail of the new package as it is rolled out. Here we pull together lessons from detailed analysis of the NAP and NHT over the last decade.

## *Selection of priority investments*

Lessons 1 to 5 relate to the selection of priority investments. They also provide criteria that should be used to evaluate plans and proposals put forward by regional environmental managers (CMAs, state governments, NGOs, etc.).

### **1. Target environmental investments rigorously**

High priority environmental investments should have at least these four characteristics: (a) particularly valuable environmental assets, (b) facing high threat or high current degradation, (c) with high feasibility of reducing that threat or degradation at reasonable cost, (d) with the required works being reasonably attractive to land or water managers. If even one of these elements is neglected, there is a high risk of selecting poor investments. A good integrated decision framework, such as SIF3 or INFFER (see [www.sif3.org](http://www.sif3.org)) is needed.

### **2. Account for technical knowledge, including locally specific knowledge**

Make sure that investments are based on good knowledge about (a) the degree of threat or damage to an environmental asset, and (b) the extent to which this threat or damage can be reduced by particular changes in management. The second of these is often neglected.

### **3. Account for known behavioural responses to policy interventions**

If the works or changed practices needed to protect the asset require changes in behaviour by private land or water managers, make sure those changes are attractive enough to be adoptable at the required scale. If they are not sufficiently attractive, you are better off developing new approaches or

technologies, or directing funds to a different problem or region, rather than flogging a dead horse.

#### **4. Selection of policy tools is as important as selection of target environmental assets**

Often we make reasonable decisions about which assets to invest in, but then very poor decisions about which policy tool to use. Should it be grants, economic instruments, regulation, technology development, other R&D, extension, engineering works, or informed inaction? Pannell's (2008) Public: Private benefits framework provides strong advice on this.

#### **5. Set realistic targets that are useful for monitoring and evaluation**

Program targets should be consistent with the known bio-physical 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. They should lend themselves to measurement, so that progress towards them can be tracked. They should specify desired outcomes, but not be prescriptive about how those outcomes are to be achieved. (However, proponents should be explicit about how they will be achieved, and should demonstrate their understanding of lessons 1 to 4.)

The monitoring and evaluation framework should be designed up-front, transparent to all players, and focused on environmental outcomes, not just inputs and activities. For environmental problems with long time lags between action and environmental response (e.g. salinity), the key approach to evaluation on a management time scale is through computer modelling, using the same sorts of analysis tools that were used to plan the investment.

#### ***Relationship with regional or state environmental managers***

Lessons 6 and 7 relate to relationship with regional environmental managers (CMAs, state governments, NGOs, etc.) who may deliver specific projects under the program, or who may propose projects to be funded under the program. Outcomes from a national, state and regional perspective can sometimes be different, and for good reasons.

The NRM and environmental market place is maturing. It expects governments to know what they want, and to be much clearer about what outcomes are desired. It also respects realistic assessments of what can be achieved and is suspicious of programs that over-promise, generate unrealistic expectations (e.g. of widespread grant availability) and under-deliver.

#### **6. Send the right signals**

In past programs, the accountability of regional environmental managers such as CMAs has focused on budgets and activities. To achieve environmental outcomes under Caring for our Country, bodies funded under the program need to be accountable for the agreed outcomes (e.g. that a particular asset will really be protected). Crucially, the bodies need to demonstrate in advance that they are accounting for lessons 1 to 4 above. Their funding should be conditional on this. Where delivery is contestable, proposals must be assessed with high expertise, and grounds for unsuccessful proposals advised (e.g. on technical grounds).

## 7. Support environmental managers appropriately and build their capacity

Policies inevitably involve someone having to make decisions about where and how the public money should be spent. These are very difficult decisions, and the local decision makers need strong support to make them. They need good data; advice about appropriate decision frameworks and principles; access to appropriate skills; time and resources to consult appropriately; and they need to not be rushed into poor decisions to meet political time lines.

### *Further Reading*

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* 46(11): 1407-1424. If you or your organisation subscribes to the *Australian Journal of Experimental Agriculture* you can access the above paper at: <http://www.publish.csiro.au/nid/72/paper/EA05037.htm> (or non-subscribers can buy a copy on-line for A\$25). Otherwise, email [David.Pannell@uwa.edu.au](mailto:David.Pannell@uwa.edu.au) to ask for a copy.

Pannell, D.J. (2008). Public benefits, private benefits, and policy intervention for land-use change for environmental benefits, *Land Economics* 84(2): 225-240. [See here](#).

**Citation:** Pannell, D.J. and Roberts, A.M. (2008). Delivering on the promise of Caring for our Country, URL: [cyllene.uwa.edu.au/~dpannell/delivering\\_cfoc.htm](http://cyllene.uwa.edu.au/~dpannell/delivering_cfoc.htm)

[Public: private benefits framework web page](#).

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# Environmental policy for environmental outcomes

David J Pannell

School and Agricultural and Resource Economics, University of Western Australia, 35 Stirling Highway, Crawley, WA, Australia 6009  
Future Farm Industries Cooperative Research Centre

## 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; and (g) account for negative side-effects of proposed environmental management actions. Environmental managers need to be incentivized 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.

## Introduction

This paper summarized 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). Funds from the Australian Government were provided conditional on matching funds being provided by state governments, with a combined total of more than \$2 billion over the past five years. CMOs were and are responsible for developing and implementing integrated regional plans for environmental investment. They appoint their own staff, but also rely 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.

It is widely accepted that the two programs were not very effective in achieving environmental outcomes. Large proportions of their budgets have been spent for 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 inquiries (Auditor General, 2004, 2008; The Senate, 2006; (Parliament of the Commonwealth of Australia, 2004; SKM 2006). There were no substantial changes to the programs in response to these inquiries. 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 plans being accredited by government. Concerns about lack of science in the programs were identified repeatedly in the various inquiries and reviews commissioned by government. For example, it was highlighted that decisions should be “based in sound, up-to-date science” (The Senate, 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 socio-economic 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 that in many regions there was a lack of sustainable land-management practices that were highly 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 prioritization 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 high threat or high current 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 prioritization 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 prioritization 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 inquiries, 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" (The Senate, 2006, p. 221).

Good prioritization 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 (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." (The Senate, 2006, pp. 229-230).

### **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 under-recognised, 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 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 recognized in official inquiries 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." (Parliament of the Commonwealth of Australia, 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 properly considered in my view.

### **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 policy mechanism choice 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 in circumstances where they had a more important negative impact on the yield of fresh surface water into the same rivers (e.g. Nordblom et al. 2004). Because the NAP and NHT programs did not deal adequately with the science of cause and effect, this was largely unrecognized 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. However, 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 disadopted it each time.

### **Setting appropriate targets**

Environmental targets should be consistent with the known bio-physical 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 this 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 provide 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 (2006) recommended that Government should “strengthen the accreditation process for regional bodies” and “ensure that funding is conditional on rigorous investment planning” (The Senate, 2006, 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 misperceptions 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 internalize externalities, and the use of extension officers to promote changes in farming practices. However, 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 localized (Pannell et al., 2001). On the other hand, the costs of reducing externalities from salinity are often large, requiring very substantial changes in land management (e.g. Dawes et al. 2002; National Land and Water Resources Audit, 2001) and the recommended changes often have high opportunity costs (e.g. 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. However, from the previous subsections 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 watertables 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 socio-economic evidence about their management. In our observation, the scientific knowledge used to design the NAP was superficial, based on a highly simplified and stylized understanding of the problem, and not encompassing the latest relevant research. (I have no knowledge of the science that influenced the development of the NHT, but I suspect that a similar observation would apply.) It did not involve effective integration of bio-physical and socio-economic information to design 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 involve partial devolution of responsibility to regional organizations with community membership. Planning and prioritization is conducted by committees, and for on-ground changes they rely 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 organizations 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 organizational 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 (e.g. 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 prioritizing investment using good science and good economics. However, I do 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 [cylkene.uwa.edu.au/~dpannell/inffer1.pdf](http://cylkene.uwa.edu.au/~dpannell/inffer1.pdf)). 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 for use in the new Caring for our Country program.

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