NATIONAL AFFAIRS

Australia

An intractable policy problem? Dealing with the salinity crisis

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For more than two decades, the steadily growing threat to regional Australia from salinity has been approached through a range of strategies including State-based education and remedial programmes; curbs on clearing in some states; community landcare activities and, more recently, strategic planning processes within government. Recognition of the need for long-term planning culminated in the October 2000 announcement by the Prime Minister of the first national salinity and water quality strategy. Yet, for all this worthwhile effort it is predicted that the problem is set to worsen significantly. Recent estimates suggest that up to 15 million hectares of agricultural land are likely to be affected (Australian Conservation Foundation, 2000). Already, \$700 million worth of productive land has been lost and large areas will go out of production in the next few decades unless the rising water tables can be reversed. Off-farm costs are equally significant: more than 80 country towns face on-going structural damage; river systems are experiencing growing levels of salinity and urban water systems threatened in some areas. The nation's biodiversity also faces one of its greatest threats from salinity. Remnant native vegetation in dryland farming regions is limited and heavily concentrated on private land and hundreds of species of flora and fauna are at risk from destruction of habitat and ecosystems. In sum, salinity is one of Australia's most serious environmental problems.

While the extent of the problem is now well documented, less well analysed is what can be done about it within a framework of public policy and law. Only comparatively recently have governments and the mainstream media actively engaged in an examination of the wideranging and complex problems posed by salinity. The consequence of this neglect is an uncertainty about what actions it is feasible for governments to adopt to address the impact of salinity on the economy, the environment and the social fabric of affected rural communities.

The complexity of Australia's salinity problems

Large areas of Australia harbour high concentrations of salt in the soil, built up over millennia by weathering of rock minerals and the deposits of wind-borne ocean salt. Two main types of salinity affect Australia's agricultural zones: irrigation and dryland salinity. Irrigation-induced salinity occurs when the quantity of water applied to crops is more than is used, with the remainder 'leaking' down to the water table causing it to rise. In dryland farming areas, saline water rises close to the surface from the underground water table due to excess 'leaking' of water following the replacement of deep-rooted native vegetation with shallow-rooted crops. In its most advanced form, the saline water evaporates through the soil causing concentrated deposits on the soil surface, completely destroying entire ecosystems.

This article focuses on this latter type of salinity in recognition of its distinctive characteristics and that of the regions in which it is found.

All states are affected by dryland salinity. However, it is heavily concentrated in Western Australia's extensive Wheatbelt region in the south-west of the State, and throughout the Murray Darling Basin of Eastern Australia where dryland salinity is found in large areas of western New South Wales, north-western Victoria, and south-eastern South Australia. These regions were extensively cleared of their native vegetation throughout this century and, in the case of Western Australia's Wheatbelt region, massive clearing was conducted after the Second World War in some of the nation's largest ever land clearing programmes. In both Western Australia and the Murray Darling Basin up to 35 billion trees are estimated to have been removed to make way for a European farming economy (Murphy, 1999).

However, simply replacing these trees to achieve a lowering of the water table is not a straightforward matter. Salinity occurs mostly on private farms with strong commercial ties to existing farming systems. A review of the policy options confirms that dealing with salinity has become an intractable policy problem for two overarching reasons: politics dictates that some of the options are not feasible partly because of the issue of private property rights, while science dictates that the optimum solutions are not yet commercially practicable.

A cost-benefit analysis of addressing salinity in Australia's dryland agricultural regions adds another layer of complexity for policy-makers. Although there are no definitive cost estimates as to the level of funding needed to stabilise and/or reverse the rise in the water table, some

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argue that it may exceed the value of the productive land lost to salinity. As Nulsen and Evans (2001: 5) point out:

To date, the most effective salinity control measure is tree planting. Estimates of the proportion of a catchment that needs to be replanted to achieve control range from 20-40 per cent. In the most seriously salt-affected state, WA, there is currently about 10 per cent of agricultural land salt affected and it has been estimated that equilibrium will be reached at around 30 per cent. If 20 per cent were immediately replanted to trees salinity would continue to increase for several years to perhaps 15 per cent. So with 15 salt and 20 per cent planted to trees (presently of no commercial value in most parts of the state), 35 per cent of the land is out of production. By doing nothing 30 per cent of the land will be taken out of production – so we may be 5 per cent (900,000 ha) ahead!

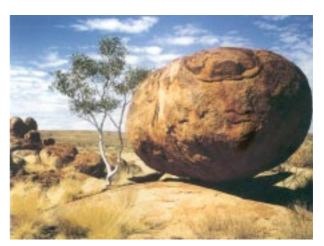
However, as Nulsen and Evans acknowledge, the economics of salinity remediation is only one criterion which needs to be factored into public policy. The above mentioned off-farm costs including social impacts, biodiversity loss and salinised water systems – let alone our collective responsibilities to nature itself – are important issues for consideration in policy development.

Government regulation

A strong case exists for government regulation to control land use management in regions affected by salinity because its very existence is a manifestation of 'market failure'; that is, the detrimental effects of a rising water table are not taken account of in the farming systems which create the problem. It is certainly not factored into the price charged for the agricultural produce. Several possible ways exist to rectify this failure. In the first place, property rights could be strengthened in relation to the water table. These rights could 'define the benefits that the owner of an asset is entitled to enjoy and the conditions under which ownership can be transferred' (Virtual Consulting Group, 2000: 13). A recent Commonwealth parliamentary report (House of Representatives Standing Committee on Environment and Heritage, 2000: 60) raised the issue of property rights, arguing that a clear definition for agriculturalists was needed to identify appropriate land management practices and who is responsible for these practices. Importantly, the report highlighted the complexity of the issue: 'For this reason there is a reluctance to get involved in the issue, and it is often relegated to the 'toohard-basket'. However, the Federal government through the national salinity and water quality strategy has called on the States 'to complete the separation of property rights for land title and introduce caps for all surface and ground water systems' (The Australian Financial Review, 11 October 2000). At the time of writing, no details are available as to the implementation of this measure but it is worth noting the political context in which it was framed by the Federal government. It was reported that in the policy development phase, an early submission from a Cabinet subcommittee canvassed the option of increased federal powers to allow the Federal government to take a more heavy-handed approach to a problem largely the responsibility of the States. However, with an election due in the following 12 months, the sub-committee shied away from anything that 'could be interpreted as an attack on farmers' rights' (*Ibid*).

Use of the water table might be governed by broader environmental legislation relating to all landowners. In a recent report, The Industry Commission (1998: 133) called for a statutory duty of care towards the environment under which everyone who manages the environment would be required to take 'all reasonable and practical' steps to prevent harm to the environment that could have been reasonably foreseen. The proposal represents an extension and codification of the common law duty of care: 'The Commission considers that the codification of this duty will clearly establish in the minds of all concerned, that protecting the environment is a continuous legal and social responsibility' (*Ibid*).

It could be argued that such a statutory duty of care would bring agriculture into the ambit of environmental legislative controls which apply to most other industries. Yet, the obstacles in the way of its immediate introduc-



"The Devil's Marble" Australia

Courtesy: Horst Richter for EH Foundation

tion are considerable. Farmers, it has been argued, 'often have an absolutist view of property rights and suggest that land ownership entitles the owner to use their land in any way they see fit, regardless of the effects on others' (Virtual Consulting Group:19). Over recent years, the determination of farmers to protect these rights has created intense difficulties for all State governments intent on curbing land clearing. Australia's poor record in clearing native vegetation was highlighted in a recent report compiled by the Australian Conservation Foundation which places Australia as the largest land clearer in the developed world and the sixth overall (*The West Australian*, 2 March 2001).

The political implications of a duty of care applied to agriculture are also potentially significant. Despite inevitable conflicts of legal interpretation over the concepts of 'reasonable' and 'practicable' in relation to farming, an enforceable 'duty of care' simply could not avoid the unsustainable basis of dryland farming in many regions. In such circumstances, structural adjustment packages to assist farmers to move out of the pastoral and cereal industries would be required, especially in light of the role governments played in opening up the land to farming. As one environmental writer has commented: 'We need rural reform and restructuring of a kind only previously seen in industries like cars and textiles' (Wahiquist, 2000). However, there are no indications that either of Australia's two major political parties regards such restructuring – and its economic, social and political costs – as either desirable or feasible.

Market-based incentives

Altering the behaviour of both producers and consumers is the widely articulated alternative to government regulation. Proponents of this view articulate its relevance to salinity:

In addressing market failure, conventional regulations tend to place uniform restrictions on all landholders or firms regardless of the relative costs and benefits to individual landholders or firms. For example, the costs or benefits of undertaking salinity remediation activities may vary greatly between landholders or firms, yet they would all be subject to the same rules and prohibitions (Salinity Experts Group, 2000: 4).

In contrast, market-based instruments 'target the overall problem for a given landscape rather than the individual landholder or firm', allowing 'the burden of salinity control and remediation to be shared more effectively among the parties' (*Ibid*.: 5).

Creating markets for new products based on more sustainable farming systems centres on the potential for plantation timbers, renewable energy and carbon credits. The aim is to attract growing private sector interest in green and socially responsible investments, through various incentive-based mechanisms, usually involving the taxation system, although a limited market for renewable energy has flowed from recent Federal Government legislation stipulating that 2 per cent of the nation's energy needs should be supplied from such sources. While there is much to recommend enhancing the role of the private sector in a transition to sustainable farming, too great a claim can be made of the role which private markets can play in addressing salinity.

In large parts of Australia's salinity-prone dryland agricultural regions – and especially those in lower rainfall areas – there is a lack of commercial deep-rooted crops to replace the pastoral and cereal industries. In fact, as the Murray Darling Basin Commission – the administrative body overseeing land and water issues in the region – has acknowledged: 'There is a pressing need in Australia for research and development into new enterprises based on high water using woody perennial plants (Murray Darling Basin Commission, 2000: 41). In the Western Australian Wheatbelt, it is estimated that 15 million hectares of the region's 18 million hectares do not currently have a

perennial plant option (Foran *et al.*, 1999: 20). Given this lack of commercially available alternatives, it can be surmised that the impetus for such research and development is only likely to come from substantial government investment or at least government industry partnerships. However, the scale of investment is potentially huge.

In Western Australia's Wheatbelt region, for example, a promising new enterprise for low rainfall regions has emerged in the form of local species of mallee Eucalyptus whose oil and residue can be used as replacements for fossil fuels in the motor transport and energy sectors. Prospects for a renewable fuels economy is expected to grow significantly this century (Trindale, 2000). However, the upfront capital requirements are very large with infrastructure needed for production, marketing and distribution. As one project leader working in this industry has written, developing a renewable fuels industry for Australia, using mallee oil and residue, would require a \$4 billion investment (Bartle, 2000). Market-based incentives would undoubtedly be useful in encouraging private industry to become involved, but the scale of the transition to this new fuels economy requires considerable policy attention from government and, according to a recent report compiled by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), would require action over 25-100 years (Foran *et al.*, 1999: p. 4).

An acknowledgment of the lack of scientific research to replace pastoral and cereal cropping industries is the establishment of a Cooperative Research Centre on plant-based solutions to dryland salinity, recently established at the University of Western Australia. Part of the task of the Centre will be to survey viable alternatives. In other words, the research effort is in its infancy.

Apart from the longer-term policy issues surrounding some of the most promising alternatives to current dryland farming types, there are shorter-term limitations arising from the application of market-based incentives. Studies show that using economic instruments in managing natural resources does not always guarantee the attainment of management objectives; in other words it is no guarantee of sustainable land use (James, 1997: 15). In the first place, farmers do not always act in purely economically rational ways; instead, they respond 'to farming culture and notions of good farm management that exist within their community. (Race et al., 1998: 241). Secondly, if farmers were to act rationally it may not incline them towards new and potentially costly ventures. Rational responses, particularly for older farmers, may be to continue with unsustainable farming practices (Industry Commission, 1996).

Communication strategies

Better educating farmers about land management issues – and salinity in particular – has been a focus of State-based Agriculture departments at least since the 1970s. There is some logic supporting these efforts: improved education for farmers enables them to make informed decisions about land use management issues. Surprisingly, perhaps, the evidence on the relationship education/train-

ing programmes and improved land use management is not clear-cut in Australian research. While some studies have found a direct correlation between participation in courses and changed farming practices, others have found little conclusive evidence of this relationship (see Industry Commission, 1998: 210 for a summary of key research findings). The latter view is supported by other research into farmers' attitudes showing an underlying conservatism among farmers manifest in a resistance to change (Pannell, 2001).

In relation to addressing the salinity problem, more searching questions need to be asked about the purpose of education/training into improved farming methods. Given that most farmers might improve their land management practices, this in itself will not achieve the level of contribution needed to avert the worst predication about the spread of salinity. The findings from Australia's foremost research organisation, the CSIRO (Walker *et al.*, 1999: 15) into farming systems and salinity provide a sobering context in which education/training strategies should be considered. The study concluded:

The large mismatch between the leakage below current farming systems and the capacity for groundwater systems to accept this leakage is the fundamental cause of our expanding dryland salinity problem. Many of the best management practices for our current agricultural systems cannot reduce leakage rates at a catchment scale to anything approaching leakage rates under native vegetation. ... There is little evidence that there are current farming systems that can reduce leakage to levels similar to those of native vegetation.

In other words, communication strategies developed for farmers may simply perpetuate the continuation of present unsustainable farming systems and deepen the eventual extent of the crisis of salinity.

Community participation

Overcoming the limitations of 'top down' farmer training was part of the rationale for the development of a grassroots landcare movement. Since 1989 a significant component of government policy on land degradation has been funding support for community-based groups to engage in remedial measures including tree planting and fencing off remnant vegetation. Launched as a Decade of Landcare, with funding of \$340 million, the programme has been:

driven by principles of community participation and empowerment. It places great value on local knowledge and the communication of this knowledge. It is a radical challenge to the traditional model which involved the government expert telling locals what to do (Baker, 1998: 4).

The stated goal of the programme was sustainable land use within the decade.

Landcare's uniqueness has resulted in many official and unofficial evaluations. Most come to the same conclusion: in terms of raising awareness and changing cultural attitudes the programme has exceeded expectations. In those States and regions with the worst salinity problems, nearly half of all farmers belong to a Landcare group (Mues *et al.*, 1998) and over 4500 registered Landcare groups exist throughout the nation (Toyne and Farley, 2000: 12). This degree of support contributed to the growth in a new ethic of landownership among significant numbers of farmers. According to the originators of the Landcare programme, Landcare 'changed community norms on what it is to be a good farmer, often between generations' (*Ibid*).

However, the on-ground impact of Landcare – given the size of land degradation problems – has been limited. In fact, a growing sense of frustration among Landcare groups at the lack of funding and bureaucratic obstacles to obtain funding is reflected in the experience of a New South Wales group, chaired by Syd Clarke.

Clarke chaired the Kyeamba Landcare Group for four years, a period in which the group realised solutions had to involve the whole Kyemba Creek Catchment. Involving more than 90 of the area's 110 landholders, the group undertook revegetation, earthworks to prevent erosion, and changed farming methods. But 11 years after the group began, members are disillusioned and fewer than half are still active. They believed it would cost \$415 million to rehabilitate the area. The land holders were prepared to fund most of it, but sought \$3 million in government assistance. Time and again submissions were rejected. 'People ran into all this bureaucracy. They keep changing the goalposts, they keep changing the terminology' (*Sydney Morning Herald*, 3 December 1999).

Thus, Landcare became a victim of its own success. Having mobilised community participation, and raised awareness about land degradation, groups have not had access to sufficient funds to carry out the work. This experience is now officially recognised. The Murray Darling Basin Commission has argued: 'natural resource management programmes which deliver a relatively low level of funding support across wide areas do not necessarily achieve the results required for managing salinity on a large scale' (Murray Darling Basin Commission, 2000: 41). The harsh reality is that the scale of revegetation in the Murray Darling Basin dwarfs the available human and financial resources: costs of up to 7.5 billion over a ten to 50 year time span (Wahiquist, 2000).

Coordination strategies

A recent report from a Commonwealth parliamentary committee (House of Representatives Standing Committee on Environment and Heritage, 2000) called for a national, coordinated approach to catchment management as being vital to ensure that land degradation problems – and especially salinity – were effectively addressed. By catchment management, the Report referred to 'the practice of managing natural resources using water catchment systems as the unit of management.' This involved integrating ecological, economic and social aspects of natural recourse management around an identified catchment system.

Public policy specialists widely acknowledge the value of coordination as one of the essential building blocks for

successful implementation of policies, the more so if responsibility for a policy issue straddles a wide range of government and non-government agencies, as is the case with salinity. Thus, according to the parliamentary report, the strengths of integrated catchment management (ICM) 'include a clear focus, integrated planning and management, and community ownership' (Ibid., 38). The committee undertook useful work in highlighting the fragmented and confusing legal and administrative framework underpinning catchment management throughout Australia. Yet, at the same time, there is a danger in over-relying on coordination processes in addressing salinity. Without the commercial, deep-rooted options available on the scale needed, and without long-term funding to support the work of local communities, improving the process will not, of itself, contribute much to lowering the water table. Moreover, local catchment groups, however well coordinated, are not necessarily able to affect the on-farm decisions taken by individual farmers (Pannell, 2000).

A recent consultant's report (The Virtual Consulting Group, 2000:15) into ICM picked up on these short-comings, concluding that it has 'performed below expectations.' Specific issues identified included: the inability to integrate activities in practice; lack of effective community inputs; patchy coverage of socio-economic and biodiversity concerns; poorly defined objectives; and under-resourcing.

Triage

In light of the difficulties of traditional approaches to policy-making to the salinity, and the crisis situation looming for much of Australia's dryland agricultural regions, some have begun to argue that the only feasible way to deal with its impacts is to adopt a triage: some land will be beyond recovery no matter what is done; some can be stabilised if measures are adopted quickly; and some can be recovered with appropriate treatment. Kevin Goss, manager of natural resources with the Murray Darling Basin Commission explains how a triage might be applied:

The bottom line will be how valuable the land is, and what recovery will cost At one end of the scale would be an internationally recognised wetland, or valuable irrigation land, or a town, where clearly there are very high values at risk ... [and where] engineering solutions are justified. At the other end of the scale would be lower value farming where there is increased salinity, perhaps

caused by vegetation loss hundreds of kilometres away. In that situation it would be hard to justify expensive remediation.

In short, triage is an admission of the intractable nature of the problems posed by salinity.

It is perhaps the only realistic option for policy-makers, yet its success in saving the maximum amount of farm-

land and biodiversity will also depend on the application of broader policy options in the areas of funding, research and development and investment in new commercial enterprises.

Conclusion

In salinity, the institutions of government face an environmental problem, the magnitude of which has, arguably, no parallel in Australia. It is not surprising that traditional approaches to policy as outlined above are limited in the current crisis. While these approaches remain important to the on-going policy debate about land degradation, adopted in combination, policy approaches such as regulation, market-based incentives, communication strategies, and coordination will be important on-going mechanisms through which the salinity problem is addressed. Approaches such as regulation and incentives remain highly relevant to the protection of precious biodiversity, an aspect of the salinity crisis which tends to get overlooked in the bigger issues of economic and social impacts.

However, the limitations of each approach suggest that singly, or in combination, traditional policy approaches cannot win the battle against salinity on the scale or in the time-frame required. Thus, the waging of an effective campaign against salinity will require a significant departure from traditional policy approaches. As Toyne and Farley (2000: 25) aptly point out: governments and landowners have not been able to face up to the size and pace of the problem and the scale of the responses required in human and financial terms. Addressing these failings will require governments to develop a vision for dryland agricultural areas beyond the largely unsustainable shallow-rooted farming systems.

The best available options appear to be the development of plantation timbers in high rainfall areas and the parallel development of a *Eucalyptus* mallee species based on a renewable fuel industry for the lower rainfall regions. This vision will require substantial investment of funds

directed at research and development which government must facilitate in partnership with the private sector. Other avenues of funding are likely to be needed in assisting farmers with the structural adjustment costs of making the transition to a sustainable system of agriculture. As one commentator has said: 'The traditional family farm may disappear, with people being paid to stop cropping and start the long-term investment of tree-planting'

(Murphy, 1999). A strengthened legislative framework is also likely to be needed to regulate the transition away from the present over-reliance on fossil fuels and instilling a broader ethic of land stewardship into public policy.

Yet, there is little indication that governments are willing to support such a departure from accepted policy practice. In particular, neither State or Federal governments have shown any interest in introducing an environment/



salinity tax from which revenues for alternative futures for dryland salinity areas can be further substantially developed. More broadly, the neo-liberal policy framework actively pursued by all Australian governments since the early 1980s has impacted on approaches to regional development. As Tonts and Jones (1997:182) have argued: 'These policies, which included a *laissez-faire* approach to regional development, resulted in a concentration of investment in regions and localities which were conducive to capital accumulation.' Other regions experienced disinvestment and peripheralisation. In other words, government would have to overturn its continued predisposition to neo-liberal policies before depressed dryland farming regions are likely to receive substantial assistance.

In sum, salinity has become an intractable policy problem substantially because political considerations have dictated the limited approaches adopted by government which has resulted in a paucity of research going back many decades. The crucial ingredient, as is so often the case with difficult policy issues, is the need for political leadership. As The West Australian newspaper once editorialised on salinity, governments have tended to be 'cowered by the enormity of the problem' (The West Australian, 22 November 1995). Having actively overseen and directed the decades of land clearing now at the root cause of the salinity crisis, governments must rise to the challenge and develop far-sighted approaches to actively save as much of the landscape as it is practically feasible. The costs of not doing so cannot be measured in strictly economic terms: the steadily encroaching salt scalds across Australia's dryland farming landscapes will be a permanent reminder of the folly of separating economics from nature.

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