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Committee Secretary
Senate Environment, Communications, Information Technology and the Arts References Committee
Department of the Senate
Parliament House
Canberra ACT 2600

Senate Salinity Inquiry

Introduction

The economic impact of salinity management in Australia is obviously related to the management strategies or techniques that currently arise from the science of a rising groundwater model. The question is whether the management strategies produce economic benefits. Environmental Research and Information Consortium Pty Ltd (ERIC) contends that this national salinity management program is a major economic and scientific disaster.

ERIC has clearly demonstrated in R&D, salinity mapping and ground assessment that the widely used and public groundwater rising model for developing salinity solutions is totally flawed. Consequently, many of the publicly managed solutions, eg. groundwater pumping and evaporation basins are causing major negative economic impacts.

The conclusion to ERIC's 15 years of studies is that degradation in soil health is the primary cause of increased salinity. That is, land use practices, eg. ploughing that produces hard pans, loss of organic matter through the export of food and fibre from the land (including ploughing, and burning), and loss of soil microbes result in soil structure declines that:

1. Lessens deep water percolation (the opposite to the current model predictions) and soil water storage capacity.
2. Increases lateral flows of soil water due to the loss of soil buffering of the salt (usually held in clays and leached deep in the soil profile away from plant roots).
3. Concentrates salt in soil water solutions that move through natural saline pathways to drainage systems (eg. creek and rivers).

These conditions concentrate saline water in drainage lines, low portions of the landscape and any other areas of slow water energy movement (eg. the edge of roadways, etc.)

Further information on the science and evidence of this process can be found at
http://www.eric.com.au/html/papers_salinity.html

http://www.eric.com.au/html/product_assessment.html (see dryland salinity pdf)

The strategies required to management salinity are soil health not groundwater. Many notable farmers such as Harry Whittington in WA, Peter Andrews in NSW and Ross Hercott in Victoria have spoken widely, in some cases over 50 years, about the flaws in the rising groundwater model and demonstrated through soil health measures that salinity on a farm can be solved in a short period ranging from 6 months to 5 years, with significant economic values returned to the farm. Similarly, ERIC has campaigned for over 10 years (along with the farmers mentioned above) for government agencies to change their management strategies but in all cases we have been ignored and in some cases ridiculed. Other private industry scientists such as Dr Christine Jones in NSW support the soil health approach to salinity management through better soil carbon management.

Issues

The general approach to dryland salinity is well characterised by the terms of reference for the inquiry. It is assumed that the cause of the adverse salinity is known and the focus is on the delivery of beneficial outcomes. With research, the focus has been on the development of practical tools. With application, the focus has been on developing ‘community based groups’ to implement solutions said to be provided by the practical tools. The activities of community-based groups are effectively controlled by Australian government organisations, and specifically the State agencies, through control of funding and the specification of salinity management methods and requirements.

Initially with dryland salinity, the occurrence of adverse salinity in areas of dryland agriculture was obvious by visual inspection and the question asked was how to fix it, hence the focus has been on the delivery on practical tools. It was assumed that the problem related to a rising groundwater system (promoted by public scientists) hence the relevant question of how it arose, while asked by some, was never seriously examined. Experience in addressing irrigation salinity was extrapolated to dryland salinity with explanations concocted as to how such a coincidence could arise.

The consequences of the current approach to salinity are most clearly illustrated by irrigated salinity as that is the origin of the rising groundwater model for soil salinity and irrigation has received most attention because of the economic consequences. In one situation in Northern Victoria (near Pyramid Hill) a short section of a natural drainage line used to distribute irrigation water was excavated to form a deep channel to improve the flow of water. The change in hydraulic relationships caused lateral seepage of water into the channel from the surrounding land, particularly over winter when the channel is empty. The seepage water has a salt concentration equivalent to seawater and so contaminates the irrigation water.

The solution being implemented at this site involves the construction of shallow interception bores at 100m intervals along the channel. The bore water is pumped into a large complex of evaporation ponds used for the commercial production of salt. This costly engineering solution is identified as having produced salinity credits by preventing the flow of salt into the Murray River when the salt accessions only arose because of the construction of the channel.

The salt production is given as an example of the productive use of saline water when the salt being harvested should never have been an issue. The potential to generate salinity credits in this manner is immense given the salinity of many Australian soils. However, the sodium chloride being harvested has low value (A$60/ton) and the only commercial benefit arises from reduced transport costs associated with the proximity of the production to potential markets. Salt production is only viable because the salt producer did not have to pay the capital development costs.

Examination of land in the vicinity of this development identifies the occurrence and development of adverse soil salinity without irrigation and without the occurrence of a rising water table. Such adverse salinity can arise simply through denudation of vegetation associated with cropping. There is no need to invoke considerations relating to water tables.

Moreover, such adverse soil salinity has been -remediated by appropriate ploughing[1] and productive vegetation management. It has been remediated through soil management.

The Whittington Interceptor Bank Technology gives the best-documented example[2]. The results conclusively demonstrate the occurrence of dryland salinity in the wheat belt of Western Australia without they're being an associated water table. Moreover, they demonstrate remediation of the adverse salinity by increasing the infiltration of water into the soil. This study alone disproves the rising groundwater model as being general.

The commonalities with implementations by farmers that have remediated adverse dryland salinity relate to changing the soil water relations by improving the soil. They all involve increasing the infiltration of water into the soil and the development of soil organic matter. These include the Whittington Interceptor Banks, the Natural Sequence Farming, and an application using the Ecoplow where the relative extents of high and low soil salinity beneficially reversed over 10 years (80:20 to 20:80).

Remediation of adverse salinity by improving the soil has production as well as environmental benefits. It is inherently sustainable. Current approaches involving major interventions and/or loss of productive land are inherently unsustainable.

The significance of these considerations for the terms of reference is summarised below.

> *An assessment of the long-term success of federal programs that seek to reduce the extent of and economic impact of salinity in the Australian environment, including:*

1. *Whether goals of national programs to address salinity have been attained, including those stated in the National Action Plan for Salinity and Water Quality, National Heritage Trust and National Landcare programs.*

From the viewpoint of sustainability alone they cannot be attained.

2. *The role that regional catchment management authorities are required to play in management of salinity-affected areas, and the legislative and financial support available to assist them in achieving national goals.*

CMA's are arms of government and at least some have regulatory powers that are used to promote their position and disadvantage landholders. The issue is not whether the support to CMA's is appropriate but whether the support to landholders is appropriate. Generally is not due to the close command and control of the CMA staff who are largely ex-State employees.

What action has been taken as a result of recommendations made by the House of Representatives' Science and Innovation Committee's inquiry 'Science overcoming salinity: Coordinating and extending the science to address the nation's salinity problem', and how those recommendations maybe furthered to assist land-holders, regional managers and affected communities to address and reduce the problems presented by salinity.

The development of CMA's can be seen as a result of the recommendation to increase the technical support for landholders. However, as identified above this has been counterproductive, as would be expected. Extending a prior ineffective system seldom increases benefits.

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[1] The Ecoplow (www.ecoplow.com), which is a development of the Wallace plough used in the Yeomans keyline soil water management system.

[2] Paulin, S. (2002). Why salt? Harry Whittington, OAM and WISALTS: Community Science in Action. Indian Ocean Books, Perth. 63 pp.

Conclusion

The primary problem with the economics of salinity management is the intransigence of the public science sector and public delivery system (eg CMA's) that is locked into hydrological solutions. Also, the Australian Government has only allocated $5m to soil health over 4 years and already Land and Water Australia (LWA) has extracted $1.8M for administration and by the time it reaches CMA's a further large sum is extracted for administration.

Consequently, self funded farmers and private companies are making the greatest economic impact on salinity through soil health management strategies. Public monies are being wasted on the groundwater rising model or hydrological solutions that exacerbate the situation (eg. pumping deep saline water of no consequence to plants onto the land surface).

There are major economic advantages in using a soil health strategy (eg. increased soil carbon and microbes) as this not only reduces salinity but also supports other soil constraint issues such as acidity. Improved soil health adds to the bottom line of farm production and productivity through increased crop yields, less plant and soil diseases, higher nutritional levels in food, etc.

The House of Representatives' Science and Innovation Committee's inquiry 'Science overcoming salinity: *Coordinating and extending the science to address the nation's salinity problem'*, has failed to adequately address serious flaws in the salinity science of public agencies. Also, the National Action Plan for Salinity and Water Quality, National Heritage Trust and National Landcare programs have failed to produce accurate maps of soil salinity and exaggerated the extents of salinity well beyond the actual situation. This case has been well documented by Jennifer Marohasy in Qld.

ERIC would be happy to give evidence in this regard and I am sure that Ross Hercott (03-54551293) mentioned above would support the position in this paper.

Yours sincerely

Robert Gourlay

Managing Director