The Australian Institute of Agricultural Science and Technology

AUSTRALIAN INSTITUTE OF AGRICULTURAL SCIENCE & TECHNOLOGY
Bringing the Elements Together

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Submission to

House of Representatives Standing Committee on Science and Innovation, Enquiry on coordination of science to combat the nations salinity problem.

Summary

In general, action on salinity problems is not restricted by information – or communication of that information. Action is prevented by lack of political will, misdirection of funding and the insurance crisis.

The production of 'information' on the salinity problem is now such that dealing with this information is a problem in itself. The large array of leaflets, booklets, scientific papers, data bases and maps have now exceeded the capacity of most filing cabinets and arguably have long since overflowed into waste paper baskets. This is wasteful of resources and may be creating a 'switch-off' mentality among the target audience.

It has been much easier to get funding to 'do more research' on salinity than to actually deal with the problems of mitigation and rehabilitation. The result is a flood of researched 'solutions' but almost no action on the ground. This is particularly so in the dryland salinity management field; the implementation of irrigation-related salinity management practices is further advanced. This lack of implementation action remains a barrier to achieving the sort of outcomes being sought by the National Action Plan on salinity and Water Quality (NAP).

(a) Use of salinity science base and research data for the management and implementation of salinity programs

We believe that the scientific/ technical community including our members, are well versed in salinity management options and have an excess of needed data in most circumstances. Unfortunately, other factors prevent implementation of solutions to dryland salinity.

Salinity in irrigation areas is easier to deal with and in general is being dealt with. There may be some need for scientific study of the effects of moving water licenses out of an area and some of the longer-term implications of salt interception schemes for receiving basins and the surrounding environment.

(b) Linkages between those conducting research and those implementing salinity solutions

Many of our members advise farmers on management of their soils and farming systems on a day to day basis. Our members have not expressed any problems in connecting with appropriate research.

(c) Adequacy of technical and scientific support in applying salinity management options

Technical and scientific support is available to the point of embarrassment. We do not need more 'research' into mechanisms and rates of salinisation. Both mechanisms and solutions have been well understood for decades. What we need now is an action plan for on-ground works in specific areas – with timelines to start remediation measures. This will also involve development of realistic solutions for dealing with social impacts – which does not seem to be available at the moment. Depending the nature of the measures, the social implications for both individual businesses and communities in general can be of considerable consequence.

Submission Particulars

The AIAST as a body has not defined a policy on salinity management and research. However, this submission has been prepared by a subcommittee of the AIAST and has been approved by the management committee of the AIAST. It therefore gives a good indication as to the opinion of concerned members of the organisation.

General comments

' Is the scientific and technical support for those on the ground implementing salinity management options adequate?'

Our answer would be that the science is good, sufficient technology for implementation of solutions is there, but (at least in the dryland situation) there are very few people on the ground actually doing what needs to be done. We see this as an emerging issue if the NAP is to have an enduring effect on natural resources stewardship.

We feel that the knowledge level as to mechanisms, rates, and probability of salinisation are well known in most circumstances. What is missing, is the funding, organisational structure and the political / social will to start meaningful on-ground works to solve or mitigate the problems. It is frequently easier to apply for another research grant to study the problem than it is to carry out other technologies to solve the problem, or even to get funding to close down significant areas of cropland and to buy out water rights.

While huge amounts of money are being spent, that money is only available in small sums. For example, a farmer who recognises he has a problem, can easily get (say) $5000 to plant some trees around fence lines – which may, or may not, fix his farm – in most cases it will not fix the off site problems. Even if all farmers in affected districts like SW Western Australia, northern Victoria or the SA Murray mallee took advantage of such grants, it is unlikely that the problem in the district would be solved. In many cases, district or regional based solutions are needed to ensure better outcomes and they are therefore be a better investment of funds.

It has been known for a long time that in most of these areas, up to 30% of farms (or 30% of farm area) will have to go into deep-rooted perennials (probably bush). This problem is not going to be solved by farmers planting a few trees around their fields.

Farmers are not going to implement solutions which they cannot afford. Our members, as consultants to those farmers, would not be so irresponsible as to recommend actions which would solve the community problem, but send their client, (the farmer) bankrupt.

We believe that there are ways to change the rules so that the salinity problem can be solved, without sending districts and individuals bankrupt. But this will require a level of planning and funding which is more directed at dealing with the problem on the ground in salinised lands rather than the political tendency of 'being seen to do something about salinity' (ie more research).

If this seems a harsh comment, then we urge you to consider that in spite of the many hundreds of millions of dollars spent so far on dryland-related salinity research, that there are few areas in Australia where the march of salinity has been reversed. AIAST acknowledges that dryland salinity management is a long-term commitment requiring ongoing investment by the public and private sectors if Australia is to succeed in stemming the problem. On-ground results are important to avoid the likelihood of landowners abandoning attempts of amelioration.

The situation relation to irrigation salinity is different. Implementation of salinity management plans in the MDB irrigation areas has resulted in measurable improvements in salinity trends and some cases of reversal of salinisation.

Guideline 1. Use of salinity science base and research data for the management and implementation of salinity programs

We believe that the scientific/ technical and extension community is well versed in salinity management options and has an excess of needed data in nearly all circumstances.

The production of 'information' on the salinity problem is now such that dealing with this information is a problem in itself. The vast array of leaflets, booklets, scientific papers, data bases and maps have now exceeded the capacity of most filing cabinets and have long since overflowed into waste paper baskets.

Action on salinity problems is not restricted by information – action is prevented by lack of political will, misdirection of funding and the insurance crisis.

The direct answer to your question is that the salinity science base is not being used as effectively as it could be. This is not because it is inadequate – it is VERY adequate, but because of other factors which prevent anyone from implementing salinity mitigation programs in the worst affected areas.

AIAST is an organisation containing many professional consultants. These consultants are the interface between the farming community and the research community. We have no problem in finding the researched solutions – but those solutions that are incompatible with business viability are of little use for resolving on-farm problems, unless they are subsidised.

In the irrigation community there is some money and (in general) we can draw on the knowledge available. We can usually offer solutions which will improve the salinity situation both on-farm and off-farm, and importantly, we can often offer increased profitability as a motivator to make something happen. So, in general availability of information and implementation are progressing at a reasonable pace in this industry.

Where dryland salinity is involved, we can only really offer 'band-aid' measures. We are unable to deal with the larger problem. In mixed farming or on grazing land there are some possible replacement pasture species which are deep-rooted perennials – and therefore a possible solution to the problem.

In cropping land, where the biggest problem exists, the only reliable solution is to return a large proportion of a district to deep-rooted perennials, often native bush – over 30% if current research is to be believed.

This could be 30% of each farm or 30% of farms in a district. Either way – both the farmer and the district will suffer serious economic and social impact. Some will probably go bankrupt – and soon after that our member will be out of a job – if he was not fired on the spot for giving such silly advice.

We need to be able to tell farmer clients that they will be supported by government in their efforts to deal with this problem. At the moment that would be a lie !

We technically know what needs to be done – its time to start looking at ways of making it happen in a socially responsible and dignified manner.

Guideline 2. Linkages between those conducting research and those implementing salinity solutions.

Many of our members advise farmers on management of their soils and farming systems on a day to day basis. Where appropriate we can draw on and refer to relevant research. Our accreditation requires that members undertake ongoing training (50 hours per year) – often delivered at scientific seminars organised by ourselves and drawing on researchers for information.

Our members have not expressed any problems in connecting with appropriate research or researchers.

Guideline 3. Adequacy of technical and scientific support in applying salinity management options

Technical and scientific support is available and adequate to the point of embarrassment. We do not need more 'research' into mechanisms and rates of salinisation. We probably do not need more detailed 'mapping' except as an immediate precursor to rehabilitation measures.

In dryland areas, funding for 'research' has been relatively easy to obtain and has usually had only an implied obligation to plant a few trees. In some areas, this is sufficient, but in general, neither the money nor the will has been available for rehabilitation efforts at a large enough scale to be effective. The effect is that a second 'research' project is often funded instead of commencing serious rehabilitation.

The few large-scale trials which have taken place have been declared a failure after only a few years. Indeed, in some of these trials, large areas of trees (up to 80%) seem to have had no effect on water tables in adjacent cropland. It is possible that in some soil types (particularly sand) that trees cannot root so deeply in a second planting (this problem is a problem for foresters is some places). I would suggest that if native trees cannot drain water tables then why do some researchers think that some (yet to be developed) new species will be able to? It may be, that there are areas which must be drained by pumping. But at this stage, we need to try the native vegetation method at realistic scales on a range of soils and in a range of catchments.

The principal reason salinity management options are not being implemented are social and financial – not scientific / technical.

While technical support in dealing with the salinity problem itself is available to excess, technical support is badly needed for alternative enterprises developing in salinised areas, and for dealing with the social and economic impacts of salinity mitigation measures.

For example, alternative enterprises developing in salinised areas badly need 'friendly' venture capital support (see below).

Identification of some problems for consideration by the committee

We have stated above that there are reasons why implementation of salinity mitigation is not happening – particularly in dryland areas. We set out below some suggestions which could be considered by the committee to encourage on-ground efforts to deal with the problem. We also identify some areas where we feel knowledge is lacking.

1. A way to convert farming land to bush with less political / social impact.

We have all known for some time, that the only way to deal with the salinisation problem in some dryland areas will be to dramatically reduce cropping area and replace the native bush – the recommendation is to replace up to 30% of the land area.

Given this knowledge there need to be the means available to start this process !

This sort of work cannot be done without major economic impact to the farmer and district. However, there are times when significant areas of farmland can be shut down and **it can be seen as a social benefit.** But this will require planning combined with a high level of consultation and communication to ensure that adequate funding is ready when the time comes. If taxpayers are to fund these works, they need to be part of the communication process.

A valuable chance, (maybe a 1 in 100 year chance), was lost last year during the drought. Many farmers - especially those approaching retirement, were ready to cease farming and would have accepted a reasonable contract to retire both themselves and their properties from cropping. An offer of a 'salary' to convert their farm (or even a few paddocks) to bush and the ability to remain in the house and retain some farmland would have been looked on favourably by many farmers. But there was no organisation or funding in place to start the process. So often the effectiveness of these actions, particularly in the rural setting, is related to timing.

However, similar opportunities will occur again. Next time, funding and support mechanisms should be ready to take advantage of times when farming appears hard or even hopeless. This way, the 'de-cropping' process can be seen as assisting both farmers and districts in times of hardship - not as a 'government putting farmers out of business' policy at a time when (with the boundless optimism of farmers) they think they are about to make a fortune.

2. In dryland cropping areas, more attention needs to be given to use of deep rooted plants in long rotations (sometimes called phase farming)

Knight et al (2002), while researching alley cropping methods as a means of controlling recharge, found that alley cropping was not particularly effective. However, in passing, they found that the water extraction capabilities of *Atriplex nummularia* Lindlay (oldman saltbush) grown as an 'alley' in deep moist soil was awesome - up to 50mm/day from as deep as 12m in just the third summer if grown under the right conditions.

The total groundwater recharge for the past 20 years was extracted relatively cheaply in just one summer by a plant that is easy to propagate and grow !

The use of long (20 year) rotations with 2-3 years of a deep rooted perennial in the rotation seems to offer a chance of achieving zero recharge with minimal disruption to farm activity and profitability. It seems likely that there would even be a fertility gain in the period under salt bush which will partly offset the lost production. In mixed farms, there need not even be a loss of productivity due to the grazing opportunities with this plant.

A variation of this scheme would be to plant salt bush on 5% of a farm each year, such that it traverses the whole farm every 20 years – a loss of productivity of only 5% - for 100% control of

recharge! We need more evidence of how this technique works in different soil types and climates.

(Reference : Knight A, Blott K, Portelli M, and Hignett C (2002) . Use of tree and shrub belts to control leakage in three dryland cropping environments. AJAR 53, 571-586)

3. Dealing with irrigation salinity in a regime of rapid water transfer.

The irrigation industry is much more dynamic than the dryland agricultural industry, and has a better capital base, which makes implementation of change more acceptable. Appropriate changes are more readily being implemented and are well supported by science. However, with the increasing transferability of irrigation waters, irrigation areas are being developed (and closed down) at quite rapid rates, thus necessitating the prediction (pre-project; prevention) and monitoring (post-implementation) of salinity trends in these areas.

Changes in water pricing, policies (the 'Cap' in the Murray-Darling Basin and water transferability) are resulting in market-driven reductions in 'low-value' irrigated cropping and pasture industries and expansion of 'high-value' horticulture land uses. New regions are being developed (eg Boort in Victoria) and water is moving out of traditional 'low-value' industries (eg the Kerang area in Victoria). The change processes need to be underpinned and supported by sound and relevant research programs (both technical and sociological) to ensure among other things that resolution of one set of problems is not causing another set for future producers.

In addition, the areas that are retiring from irrigated agriculture will need attention as without proper management they could result in future problem areas with stored salts affecting downstream new developments.

4. Water use efficiency and snake oil

The demand for ever-improving water use efficiencies will have to be supported by sound research programs. As part of improvements in water use efficiency, we need to have improved soil water measurement technology, software to estimate water usage of various crops which is appropriate for use by growers, and we need education programs to ensure that these improvements are used properly.

In recent years, growers have actively sought to improve water use efficiency- with some success. However, this interest has yielded a rash of water treatment and water measurement technologies, some of which are either very poor at doing what they claim, or are deliberate 'scams'. Growers who are willing to use their own money to improve the situation are being 'ripped off' because the government has not been prepared to take a leadership role in evaluating these methodologies. This is having the effect of stifling attempts of grower problem solving and is discouraging initiative.

Accreditation of devices and technologies is not credible if done by consultancies – it requires the unbiased study by a government authority. At this critical time, as an example the South Australian government (at least) has banned comparative studies of water sensing technologies.

We badly need field scale (preferably 'on farm') comparative studies of water sensing technologies and water treatment devices; the more 'way out' the technology, the more we need to see it tested in a transparent and rigorous fashion.

5. Professional liability issues

Agricultural consultants have been affected by huge increases in professional liability premiums which are seriously impeding professional consultants in all aspects of their work. Insurance cover for salinity work is extremely expensive and most insurance companies will not cover the risk attached to salinity work. If we are working for (say) a council and were to act in a responsible way, we would be forced to state that the only way to deal with the dryland salinity problem (on best available research), would be for identified tracts of land be returned to bush. In most districts, the livelihoods of many farmers would be at stake, as well as the value of millions of dollars in farmland. Many farmers would, quite properly, fight the decision in the courts. There is no clear idea how such an action would come out or who would end up paying the legal bill. This is a lose-lose situation for everybody.

Until this problem of professional indemnity is solved, there will be little remediation of salinity problems in dryland agriculture and the problem will continue .

Many experienced established consultants in salinity work have left the industry due to the risks and the impossibility of getting insurance cover.

If the insurance problem could be solved, costs would decrease, the available workforce would increase, and the level of experience available to deal with salinity issues would increase dramatically.

A smaller problem, but the cause of a gross waste of public money, is the requirement of many government bodies and funding organisations, that subcontractors have huge professional liability insurance cover. This adds significantly to the cost of the job, but provides no meaningful risk cover. The risk is long term, but any cover expires at the end of the contract, or at the end of the contractor's association with that insurance company.

6. New plants for salinised lands in dryland production systems

There is no doubt that recent efforts to find and develop new plants appropriate to a salinised non-irrigated landscape, have yielded many new options for farmers whose land is going saline. Some of these options allow income to be derived from saline soil at minimal investment and have been a success - particularly where the problems are not so severe that establishment of some vegetation can help to lower water tables in time to save the property.

Efforts to find more such plants that are environmentally low risk should be continued and accelerated if possible because the best chance to deal with salinity in its early stages is to be able to offer either income producing options, or at least plants to lower water tables which can be established in such locations, at low cost. These plants do not offer solutions to advanced salinity conditions – either now nor in the forseeable future.

7. Salt and saline water based industries need greater support

Of available technologies, pumping saline ground water to evaporation basins appears to be the most viable solution to rising saline ground water in many salinised areas. Industry based on this water could partially mitigate the cost of this 'engineering' solution in both economic and social terms. From a government perspective, the establishment of new industries to use saline groundwater will mean that future pumping programs can be funded privately instead of continuing to require a source of public revenue. We support encouragement of private investment, including the use of market-based instruments to assist investment.

Innovative technologies have been developed to generate jobs and industries based on the saline lakes or the salt itself – many of these have floundered, not because the industry is non-viable, but because long term capital investment appropriate to a developing industry could not be found. Such industries not only help solve the problem of salinity but provide a solution with less social impact than alternatives.

These industries also represent hope for new economic activity for regional areas which may well suffer if farming is curtailed to reduce salinisation (or if salinisation proceeds unchecked).

These industries include aquaculture based on saline groundwater supplies (mariculture), salt and other mineral extraction industries, and energy production from saline lakes. Establishment of these industries usually requires capital investment which in cities is usually provided by larger corporations. But such corporations do not consider a potentially salinised farming area, or a family business, as an acceptable risk.

If these industries are to be established, they will require some 'friendly' investment capital - but nowhere near as much as it would cost to shut down whole areas due to salinity.

A successful example is the salt production facility at Pyramid Hill which is not only making money for its owner, but after only 5 years, has returned much of the surrounding land to productivity.

An unsuccessful example is that of the aquaculture venture at Cookes Plains in SA. After two years, it proved that saline groundwater could be used to produce a range of high value aquaculture products. Then it had to be mothballed because the funding bodies felt that the 'principle' had been proven and the rest was up to private industry.

8. Dealing with the saline effluent of pumping programs

To date, the most successful means of solving both dryland and irrigation salinity is pumping groundwater to evaporation basins.

It is almost impossible to confine high salinity water in an earth dam. In South Australia, the dominant disposal basin at Stockyard Plain is leaking almost as fast as water is being pumped in. The view that it will be at least 50 years before the water gets back to the Murray is short sighted in the extreme. As indicated earlier in this submission, it is essential that we do not adopt expedient solutions and thereby create another set of problems, unless such an approach is a recognized and stated part of the strategy.

It is clear that this sort of situation needs more scientific attention and some regulation.

AIAST commends the committee inquiring into this important issue for much of our valuable agricultural lands. We thank you for the opportunity to comment and we are interested and willing to appear before the committee in the event of it seeking verbal submissions.

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