Salinity Investment Framework III (SIF3): A comprehensive investment framework for dryland salinity in Australia

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We developed SIF3 in response to the need for a more rigorous approach to salinity investment, based on latest research knowledge. It is based on research from several different fields, including hydrogeology, biology, farming systems, resource economics, social science and policy mechanism design. The framework integrates this wealth of information to identify how best to respond to dryland salinity in different circumstances.

SIF3 is consistent with existing asset-based approaches to NRM investment, but includes considerable knowledge of salinity, in all its aspects across Australia. We hope that it will achieve two outcomes:

1. Enable the community to more easily use latest science in their NRM decision making
2. Improve the effectiveness of the next round of the NAP, in terms of both improved salinity outcomes and better bang for the buck

How does it work?

We identified 60 distinct situations where specific strategies could be recommended, depending on the type of asset affected, hydrological conditions, and the adoptability of available management options. Recommendations are very sensitive to these conditions, and are based on a mixture of research results, theory, judgments and logic. A feature is that all of this is made explicit, so that it is open to discussion and debate. A paper by Ridley and Pannell (2005) provides full details. A very brief summary follows.

Types of impact

Four different classes of salinity impacts are considered: (i) water resources, (ii) high-value terrestrial assets such as built infrastructure and key biodiversity, (iii) dispersed assets such as agricultural land, and (iv) salt-affected land.

Response options

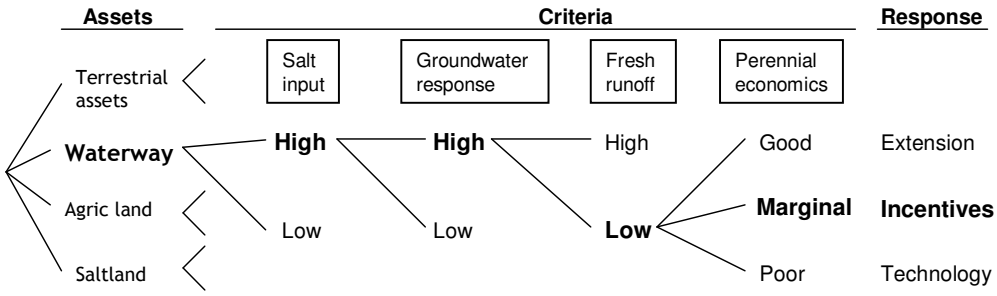
Responses are considered in the following broad groups

- *Extension:* Technology transfer, education. Relevant where existing management options are attractive to land managers.
- *Positive incentives:* to encourage a change of management. Examples: subsidies, market-based instruments, cost-sharing. Relevant to promote existing management options to protect public assets where off-site benefits exceed on-site costs.
- *Negative incentives:* to discourage a practice or land use. Examples: transferable water rights, regulation on land use or drainage, zoning, government acquisition. Relevant to discourage existing plant-based systems in some circumstances, e.g. forestry in water resource catchments where salinity management can cause downstream costs.
- *Engineering:* Salt interception through pumping saline water to avoid discharge into rivers. Local engineering works on-site to protect public assets where problem is generated locally (e.g. many towns). This category represents direct investment in public engineering works. It has high costs, and variable effectiveness, so is only applicable in carefully selected cases.
- *Technology change:* Invest in development or improvement of technological options for salinity management, particularly plant-based R&D systems. May also include investment in infrastructure, market institutions, etc. to support profitable new industries.
- *Other R&D:* e.g. Research to provide information to support planning and decision making. Research into the performance and design of engineering options.
- *Land retirement:* Incentives for land-use change to non-commercial uses.
- *No action:* No response is justified where the costs of intervention outweigh the benefits.

For interventions requiring changes in private land management, the recommended policy response is based on our Public: Private Benefits Framework (Pannell, 2008).

Decision tree approach

The process of identifying the appropriate response to salinity is illustrated in the figure below. It shows how the choice depends on the type of asset and on several other factors. The set of influential factors is different for each asset type. For waterways, as outlined in the example, the important factors are salt input, groundwater response, fresh runoff and the economics of perennials. There are different decision trees for the other asset classes.



The SIF3 project

The project has worked closely with the North-Central CMA in Victoria and South Coast NRM in WA to test the SIF3 framework. The project has:

1. tested SIF3 in collaboration with the two resource management bodies
2. adapted it in response to practicalities and existing processes
3. improved understanding its usefulness/limitations.
4. improved understanding of existing capacity issues and capacity-building needs, inside and outside the resource management bodies
5. communicated results widely

Conclusion

What is SIF3, really?

- A highly integrated body of knowledge
- A tool to guide salinity investments at the regional level
- A guideline for evaluating investment proposals
- A learning tool for policy players
- A participatory project

SIF3 highlights the need for salinity investments to be highly sensitive to case-specific circumstances, and well informed by science. It implies that there should be a number of shifts in emphasis in the funding directions of the existing policy program, most notably less emphasis on incentives and extension. It confirms the appropriateness of the attention that has recently been given to engineering and permit-based approaches. Given that two of the more prominent policy responses in our recommendations are technology development and penalties, and that these are likely to be best considered, managed and implemented at scales greater than existing regional bodies, the balance between decision making at regional and other levels should also be carefully considered.

Acknowledgments

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Reference

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