

# Lessons and Implications from the SIF3 Project\*

David Pannell<sup>1,3</sup>, Anna Ridley<sup>2,3</sup>, Eloise Seymour<sup>2,3</sup>, Sally Marsh<sup>1</sup>, Roger Wilkinson<sup>2,3</sup>

<sup>1</sup>University of Western Australia

<sup>2</sup>Department of Primary Industries, Victoria

<sup>3</sup>Future Farm Industries CRC

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The Salinity Investment Framework (SIF3) (Ridley and Pannell, 2005, 2007; Pannell, 2008) provides a rigorous and sophisticated approach to salinity planning and prioritisation. It integrates current research knowledge from hydrogeology, biology, farming systems, resource economics, social science and policy mechanism choice. By combining these elements with local information about community values and knowledge, regional bodies can identify the responses to dryland salinity that will have the greatest overall impact in any given circumstance.

The SIF3 project ([www.sif3.org](http://www.sif3.org)) has generated a diverse set of insights into regional natural resource management. These insights have been discussed in a range of reports (Pannell et al. 2007; Ridley and Pannell, 2006a, 2006b; Seymour et al., 2007a, 2007b, 2007c; Wilkinson 2007). Here, we pull together the main insights of the project already identified in those reports, and identify lessons that arise from the project as a whole. The lessons and implications are for governments (national and state) and regional environmental managers (or catchment management organizations).

## The big picture

### *The potential for improved investment outcomes*

Taken as a whole, the project indicates that there is considerable scope to improve the level of natural resource management outcomes from public investments through programs such as NAP and NHT. Improvements are possible through better targeting of resources to assets where the investment will be more cost-effective, through better selection of policy tools to achieve the desired benefits, and through better recognition of situations where informed inaction is the most appropriate response. Many of the insights below relate to specific aspects of this overarching insight. With appropriate responses to these findings, it appears that substantial NRM gains are readily achievable.

### *Focus on natural resource management outcomes*

It appears possible that an inadequate focus on outcomes by government funders lies at the heart of many of the issues that have emerged in this study. A clear focus on outcomes rather than processes, expenditure and activity, would necessarily lead to a requirement for stronger decision frameworks, good integration, use of best-available information, and good

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evaluation processes. Regional NRM bodies will need support in each of these areas, but the necessary first step appears to be for governments to commit to outcome-oriented programs based on evidence-based decision making.

### *Handling community expectations*

The results of the project reveal the need for changes in the way that the regional delivery model for NRM operates, in order to achieve greater NRM outcomes. Inevitably this will create tensions within sectors of regional communities who are used to an existing approach, and have developed expectations based on the operation of past programs. Handling these tensions and expectations requires very good communication from governments and regional bodies, explaining the rationale for and implications of the new approach.

Some individuals in regional NRM bodies seem to give considerable weight to the community tensions that may emerge from a more rigorous approach. Based on our experience in this project, we make the following observations:

- A proportion of community members welcome the changes. Only a minority are resistant to the changes (often people who are currently receiving incentives).
- The case for change is compelling and can be readily explained.
- Sometimes it is claimed that relatively untargeted spending is “fairer”. However the fairness dimension of NRM is more complex than this, and there are strong grounds for arguing that untargeted spending is *less* fair. It engages landholders in works that are unlikely to achieve worthwhile NRM outcomes, and uses up their valuable time and resources in doing so. For this reason, in the long run it risks using up the stock of good will that landholders have historically brought to their environmental works.
- The approach taken to community engagement is important in managing expectations about how and where program funds may be spent.

### **Improving the capacities of regional NRM bodies**

Regional NRM bodies have strong human resources in some respects, but there are a number of important capacity gaps that appear to be commonly shared by them. The key ones are in the areas of: selection and evaluation of scientific information; use of economic and social information; integration of diverse information types in planning and prioritisation; and monitoring and evaluation. These are further discussed below.

### *Use of best science*

Our experience in this project reinforces the view that good regional NRM planning and prioritisation requires a strong evidence base and good analysis, combined with good judgement by decision makers. Currently, many regional plans have relied strongly on judgement, but have room for improvement in the use of evidence and analysis. For example, for many of the works that have been funded, there is little knowledge of their likely NRM outcomes. Indeed, in certain cases, funded works may be generating NRM costs that exceed their benefits (e.g. perennials using surface water that would have been valuable to downstream water users).

For government, this suggests the need for an improved process of accreditation of regional plans. As part of this accreditation, plans should be assessed to see whether they make appropriate use of science to determine likely NRM outcomes from planned actions. We suggest that regional bodies should be required to address this explicitly in their plans.

In addition, the regions need support from governments through the provision of quality-assured data needed for planning. There are important gaps in the required data in many (and perhaps all) regions.

Most regions appear to pay insufficient attention to the issue of research quality. A large share of research information used is not subjected to the standard method of quality assurance for research: peer review. Important pieces of research should be subjected to independent review, preferably in the course of publication in scientific journals. Guidance to regional bodies about this would be valuable.

Given the complexity of NRM planning, it is not necessarily clear which science is needed to support decision making. This is related to the issue of integration, and the use of more sophisticated decision frameworks, which are discussed below.

To oversee all of these science-related issues, we suggest that regional NRM bodies should consider the appointment of specialist science coordinator positions. These appointees could also handle liaison with researchers, and consideration of the relevance and importance of research results, bringing important findings to the attention of relevant decision makers within their organisations.

#### *Economic and social information in regional NRM planning*

The most consistent and conspicuous capacity gap identified in this research is in economics. There are many ways that economic expertise and economic information can improve the processes of NRM planning and prioritisation. The minority of regional bodies who make use of economics at all do so in a limited and narrow way. The use of social information is also limited, mainly focussed on social profiling, which is probably not sufficient to guide improved decision making. Regional NRM bodies need to make greater use of economic and social information in NRM decision-making, particularly in assessing likely behavioural responses to interventions. It would be valuable, where possible, to involve economists and social scientists in their committee structures. Governments should consider ways to support this.

#### *Integration*

In most cases, the integration of information in regional NRM planning occurs informally and in ad hoc ways. There is considerable scope for more formal integration through structured decision frameworks such as SIF3. Such frameworks also provide guidance on which information is needed to support particular decisions.

#### *Selecting targets*

Current processes for selecting NRM targets are often very weak. Targets should be based on analysis, and should realistically reflect the available resources and the likely behavioural responses on landholders. Very few of the existing targets do so. Many regional bodies recognise the weakness of their targets. They commonly have an aspirational flavour (which seems to have been encouraged by government guidelines) and in many cases they are constrained by judgements about the expectations of the community (or at least an engaged subset of the community). Commonwealth and states should revise their requirements for target setting to ensure that targets are measurable and achievable, which implies the need for them to be spatially explicit and time-bound.

### *Monitoring and evaluation*

Regional NRM bodies recognise monitoring and evaluation as an area of weakness. We believe that improved approaches for selecting targets are an essential prerequisite for improving monitoring and evaluation. Current monitoring and evaluation activities tend to be focused on activities and outputs, rather than on the achievement of NRM outcomes. They also seem to be primarily focused on accountability, and consequently to be disconnected from decision making. Monitoring also needs to encompass strong technical knowledge about NRM processes, not just knowledge about administrative processes. Improved monitoring and evaluation should be closely linked to improved target setting.

## **Supporting regional NRM bodies**

### *Alignment of agency activity to support regional planning*

In many of the above areas, state agencies have relevant expertise and information. In some cases the scientific links between agencies and NRM bodies could be strengthened.

### *The guidance to regional bodies needs to go beyond principles and processes*

In the early days of the current regional arrangements, regional bodies received very little specific guidance on how to go about their planning and prioritisation activities. Over time, more guidance has been forthcoming, usually in the form of advice about processes and principles that should be adhered to (e.g. the Natural Resources Commission of NSW has developed an NRM “Standard”).

Our experience in this project indicates that this is not a sufficient level of support and guidance. We believe that integrated decision frameworks like SIF3 are needed, in order to help decision makers to:

- Recognise the implications of latest research and analysis.
- Appropriately integrate disparate information types.
- Recognise all relevant information types.
- Easily and efficiently narrow the number of investment options to a short list for detailed feasibility assessment.
- Recognise the important distinction between localised and dispersed assets (see below).
- Employ appropriate program logic, bringing together all relevant elements: asset value, degree of threat or opportunity, feasibility of reducing the threat or capturing the opportunity, cost of intervening, the behavioural response of landholders, and the link between that behavioural response and NRM outcomes. With very few exceptions, the program logics used by regional bodies are deficient and partial.
- Select policy tools that are appropriate to the circumstances (see below).

## **Choosing appropriate interventions**

### *Selection of appropriate policy responses*

The Public:Private Framework (Pannell 2008), developed as part of this project, provides strong guidance on the use of policy tools to achieve the desired changes. It is already being widely adopted, including internationally. In Australian NRM, our findings indicate that a large proportion of the budget is being channelled through policy tools that are not the most appropriate options. For example, much of the expenditure on extension is promoting

activities that are not adoptable on the scale needed to achieve the target NRM outcomes. In many such cases, the priority for protecting dispersed assets, such as agricultural land, should be development of improved land-management technologies (e.g. new types of perennials that are as profitable as the best existing land uses) in order to ensure that a suite of adoptable practices are available. In other cases, where the focus is on protection of a high-value localised asset, the intervention needs to include engineering works (where feasible and cost-effective). Currently, regional bodies overall give much too little attention to this option. In cases where the yield of fresh surface water into waterways to downstream users is high, the priority should be a form of “negative incentive”, such as regulation. This may mean that responsibility for the intervention needs to rest with government, rather than with a regional NRM body, depending on its powers and willingness to apply them.

#### *The roles of building landholder capacity*

As indicated in the previous section, the project has strong implications about the use of capacity building among landholders as a tool to achieve NRM outcomes. Capacity building in the form of extension, education, training, etc. should be the main response in situations where there exist land-use practices that are believed to be adoptable on a scale that would achieve NRM targets, but which are not yet adopted. This requires quite a sophisticated assessment in order to select cases where it is appropriate to use extension and related approaches (including small, temporary incentives to encourage trialling). Currently, extension is being relied upon in many situations where it is highly unlikely to achieve NRM outcomes.

Capacity building in the form of technology development is an under-recognised and under-resourced option. There is likely to be an important role for extension agents in working with researchers and landholders in participatory research as a part technology development efforts. In other words, there is an implied shift in emphasis and skills for existing extension agents involved in NRM.

#### *Adopting an asset-based approach to investment*

In existing regional plans, there is a tendency for investment priorities to emerge from an assessment of NRM threats. Instead, the starting point for planning should be identification of specific assets (hence the term, an “asset-based approach”). Focussing on assets allows better focus on relevant land-use changes (one asks, what changes would be needed to protect this asset?) and therefore a better handling of cause and effect. It allows actions to be better targeted to specific locations that will actually contribute to desired outcomes. It also assists in the process of excluding lands from investment. Given available budgets, most lands should be excluded from direct investment in on-ground works. An efficient way to achieve this is to focus works onto areas closely linked to a small number of priority assets.

#### *Distinguishing between localised and dispersed NRM assets*

As part of an asset-based approach, it is crucial to distinguish between localised assets (such as a specific wetland or nature reserve) and dispersed assets (such as agricultural land or remnant native vegetation on farm land). The latter category is lower in value per hectare than the former, but exists over much larger areas. This needs to be accounted for appropriately in NRM planning. In particular, the highest priorities for direct investment in land-use change are likely to be localised assets, especially in the case of dryland salinity. In order for investment in dispersed assets to be competitive, the cost needs to be low and effectiveness high. This points to strategies such as extension (in those cases where practices

are adoptable but not yet adopted) and technology development (where practices are not yet sufficiently adoptable). Alternatively, conservation tenders could be used to identify situations where there is sufficiently low cost of intervening in those dispersed assets that generate public benefits, such as remnant vegetation. Overall, dispersed assets need to be handled rather differently than localised assets in the prioritisation process.

#### *The need for patience*

NRM planning and implementation requires patience in two ways. One is patience to conduct an appropriate analysis and consultation process to support decision making. In the current regional arrangements, there has been considerable pressure on regional bodies to rush into spending on on-ground works, often without a strong basis for selecting those works. The other requirement for patience is in the selection of policy tools. The expectation that a high proportion of investment will be directed to on-ground works is highly counter productive in many cases. For example, it results in under-investment in technology development, and in some cases, under-recognition of the role of negative incentives.

#### *Resourcing for NRM analysis*

Our experience in this project is that an adequate analysis to support NRM planning and prioritisation requires concerted effort, significant resourcing, and support from relevant experts.

### **Key knowledge gaps**

The project identified long lists of specific information that is lacking within the two regions studied most intensively. More generally, it also identified the following more general gaps.

- The farm-level economics of sustainable land-use options, reflecting the spatial heterogeneity of resources and farm types.
- Non-economic influences on the adoptability of those land-use options.
- High quality spatial data sets for likely future salinity impact, and current salinity status (e.g. groundwater depth, groundwater salinity).
- Methods to compare priority investments across asset types (e.g. rivers versus infrastructure).

### **References**

All SIF3 discussion papers cited below are available at [www.sif3.org](http://www.sif3.org), as are pre-publication versions of the journal articles.

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