National Land & Water Resources Audit
An Initiative of the Natural Heritage Trust

Signposts for Australian Agriculture

Stage 3a: Completion of three industry profiles

BRR46

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Australian Government

Bureau of Rural Sciences

Signposts for Australian Agriculture

Stage 3a: Completion of three industry profiles (BRR46)

Jean Chesson, Benj Whitworth and David Carlisle

Final report to the National Land & Water Resources Audit, March 2007.

Foreword

Signposts for Australian Agriculture has been developed through a partnership involving the Department of Agriculture, Fisheries and Forestry Natural Resources Management Division, the National Land and Water Resources Audit, the Bureau of Rural Sciences, state government agencies and rural research and development corporations.

Signposts has also attracted additional support from the Rural Policy and Innovation Division and the Food and Agriculture Division of the Department of Agriculture, Fisheries and Forestry.

Signposts is a multi-staged project designed to help industries, governments and the community understand the environmental, economic and social contributions of Australian agricultural industries.

This stage of *Signposts* (Stage 3a) focuses on the creation of industry profiles of the horticulture, beef and dairy industries and aims to demonstrate the potential of *Signposts* as a provider of quick and reliable information for government and industry policy makers. This report documents the process behind the development of those profiles including consultation and reviews by the Australian National University and Australian Bureau of Statistics. Stage 3a builds upon the Grains Industry Profile developed by the Bureau of Rural Sciences (www.signposts4ag.com/signposts-grains) in collaboration with the Grains Research and Development Corporation, the Grains Council of Australia and the National Land and Water Resources Audit.

This report should be read in conjunction with *Signposts for Australian Agriculture Stage 3b: Industry Pilot Report* by the Centre for International Economics which uses the Grains Industry Profile to conduct an analysis of the industry's contributions to ecologically sustainable development.

The next stage of Signposts, scheduled for completion by June 2008, will expand the industry profiles and produce final reports on the contributions of six key agricultural industries. We are confident that the *Signposts* project has created a legacy that will extend beyond that date.

Stephen Hunter
Executive Director
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Acknowledgments

We thank the members of the Department of Agriculture, Fisheries and Forestry, staff of the National Land & Water Resources Audit, representatives of state, territory and Australian Government agencies and research and development corporations and colleagues in the Bureau of Rural Sciences for their willingness to contribute to this project.

We particularly acknowledge the support and guidance of Karen Cody, the Audit Project Manager, and of Jim Donaldson and Phil Pritchard from the Department of Agriculture, Fisheries and Forestry.

Executive Summary

Signposts for Australian Agriculture (*Signposts*) has been developed through a partnership between industry, government and research organisations. It provides access to social, economic and environmental data specific to an industry and geographical area to inform policy development, strategic decision making and future research priorities.

This report presents the outcomes of Stage 3a – Completion of three industry profiles. The objectives of Stage 3a are to:

1. contribute background information towards the pilot report on one industry by documenting the need for, purpose of, and approach used to generate the *Signposts* framework.

2. further expand three industry profiles developed in Stages 1 and 2 of *Signposts*, in consultation with research and development corporations (RDC), government and research stakeholders and present them in a hyperlink enabled web based CD report and hard copy form, and to one joint workshop of RDC and government jurisdictions.

The deliverables of Stage 3a are:

1. Three issues papers:
    a. A specifications paper describing the content of the industry profiles.
    b. A paper describing the extent to which the framework can be used to provide a 'regional report' on agricultural industries.
    c. A paper on a topic to be determined by the Audit.

    The topic of the third paper was subsequently determined to be the feasibility of extending the *Signposts* framework along the supply chain.

2. Three profiles of significant commodity industries.

3. A website which supports the presentation of the three Signposts industry profiles and the BRS Grains Industry profile and allows stakeholder comments on the four industries to be recorded.

4. A joint workshop of RDC and government jurisdictions at which the three industry profiles will be presented.

5. A report:
    a. providing background information on:
        i. the need for and purpose of Signposts
        ii. the approach used
    b. describing the process followed to generate the profiles and stakeholder comments.

Stage 3a of *Signposts* has achieved its project objectives:

- Material has been collated from previous reports and other sources to provide a comprehensive description of the principles underpinning the development of the *Signposts* framework. This material will have a variety of uses including the updating of the 'About Signposts' page on the website and as a source of background information for the hard copy summary reports planned under Stage 4.

- The website www.signposts4ag.com now houses electronic profiles for the grains, beef, dairy and horticulture industries. The grains profile is publicly available. The other three profiles are password protected. Each profile has 29 active components. A total of 39 components (13 for grains, 10 for beef, 9 for dairy and 7 for horticulture) have detailed results for indicator values and summary measures. In addition, the profiles contain information on a total of 56 management practices (17 for grains, 14 for beef, 9 for dairy and 16 for horticulture) with a number of others close to completion. The profiles have been developed with input from RDC, government and other stakeholders through direct consultation, a workshop, a reference group, commissioned reviews and online comments.

There is, however, a requirement for ongoing consultation. The workshop recognised that RDCs required more time to consult with their stakeholders and the timelines for Stage 3 were extended to accommodate this. Difficulties in determining the spatial extent of each industry have meant that bio-physical components have only recently reached a point where review is useful. Therefore it is recommended that a final review of the content of the beef, dairy and horticulture profiles occurs in Stage 4 setting out the processes and timelines to be followed. The plan needs to allow RDCs and other stakeholders adequate opportunity to review material without being unduly burdensome.

In addition to addressing its two main objectives Stage 3a has also updated the *Signposts* component tree based on recommendations from two commissioned reviews and produced three issues papers.

The ability of the *Signposts* framework to incorporate recommendations from a series of reviews while maintaining its overall conceptual framework suggests that the basic approach is robust. The Grains Industry Profile has formed a firm foundation for the development of three more industry profiles and all four profiles continue to benefit from the lessons learned. The goal of having an evolving framework that improves over time appears to be achievable.

Contents

Introduction

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    a. providing background information on:
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This report is deliverable number 5 in the above list. The introductory chapter is followed by 'The *Signposts* Framework' which documents the need for, purpose of, and approach used to generate the *Signposts* framework in order to address Objective 1. Subsequent chapters describe the creation of three additional industry profiles and the associated consultation process (Objective 2). Conclusions and recommendations are provided in a concluding chapter.

The three issues papers (deliverable 1) are attached as appendices:

- Specifications Paper (Appendix A). Submitted to the National Land & Water Resources Audit (the Audit) on 10 May 2006.
- 'Using *Signposts* to report on industry's contribution to regional NRM targets' (Appendix B). Submitted to the *Signposts for Australian Agriculture* Reference Group on 11 August 2006.
- 'Feasibility of extending the *Signposts* framework along the supply chain' (Appendix C). Submitted to the *Signposts for Australian Agriculture* Reference Group on 11 August 2006.

Background to the *Signposts* Framework

The development of the *Signposts for Australian Agriculture* framework has been documented in various reports (Chesson and Whitworth 2005, ABARE 2005, Chesson et al 2005), issues papers and minutes. The purpose of this chapter is to consolidate the information into a convenient and accessible account of why *Signposts* was developed, the principles underpinning the *Signposts* framework and how *Signposts* relates to other initiatives.

Need and purpose

Agriculture, in common with other resource-based industries, is coming under increasing pressure to justify its access to and use of natural resources. The principles of ecologically sustainable development adopted by all Australian governments (COAG 1992) and included in a modified form in the *Environmental Protection and Biodiversity Conservation Act 2000* require decision making processes to effectively integrate both long and short-tem economic, environmental, social and equity considerations.

In 2004, DAFF commissioned the Audit to explore means of reporting on the contributions made by Australia's primary industries to ecologically sustainable development through a project entitled 'Signposts for Australian Agriculture – the role of agriculture in natural resource management, economic growth and community life' (*Signposts*). The aim of *Signposts* is to provide access to social, economic and environmental data specific to an industry and geographical area to inform policy development, strategic decision making and future research priorities.

Approach

The development of the *Signposts* framework is underpinned by the following principles:

- A clearly defined subject, question and scope
- A partnership between government, industry and other stakeholders
- A credible theoretical basis
- Flexibility to evolve over time, respond to needs of individual industries and to report at different levels of detail
- Outcome focussed rather than indicator focussed
- Linkage of management practices or responses with outcomes

Each of these principles is elaborated below.

Subject, question and scope

The *Signposts* framework has been designed to address the question: 'How does an agricultural industry contribute to ecologically sustainable development?' where ecologically sustainable development is defined as:

> *Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased* (National Strategy for Ecologically Sustainable Development, Commonwealth of Australia 1992).

Signposts does not ask 'Is an industry sustainable?' because the question is ambiguous and a yes/no answer is unhelpful. *Signposts* asks 'How does an industry contribute to sustainable development?' because the question is immediately interpretable in terms of contributions to various capital assets, encourages evaluation of whether those contributions are acceptable and stimulates actions to increase positive contributions and reduce negative contributions.

The initial scope of the *Signposts* framework is the primary production sector, that is, the set of activities carried out on the farm and referred to as dairy farming, grains growing, wool growing etc. While the scope is restricted to activities behind the farm gate, the assessment of the contributions of those activities to sustainable development are not restricted in any way. They include positive and negative contributions to all bio-physical, social and economic systems at the farm, local, regional and national scale. For example, the impact of grains growing on global climate and consumption of fossil fuels is in scope. So too are the impacts of grains growing on the economies of local and regional communities. Sectors further along the value chain, such as the baking industry and the retail sector, are not included as part of the primary production sector.

More recently, options for extending the *Signposts* framework along the value chain have been explored (Appendix C). Based on case studies of the bread sector of the baking industry and the confectionery industry, the environmental components of the *Signposts* framework have been generalised so that they can be applied to any sector along the food value chain and a process has been proposed for whole chain reporting up to the factory gate (Chesson, Morgan and Whitworth 2006). The same process can be applied to economic and social components. An initial focus on the primary production sector is still appropriate as it is a necessary part of any assessment further along the value chain.

Partnership

Signposts has been developed through a partnership between industry, government and research organisations. The framework has evolved in response to stakeholder comments as documented in this and previous *Signposts* reports. While the generic form of the framework is becoming relatively stable, it will continue to be tailored to the specific needs of individual industries.

Theoretical basis

Figure 1 shows economic systems embedded within social systems which are in turn embedded within bio-physical systems. In the Signpost framework, development is interpreted as an overall increase in the value of our assets where assets are interpreted in

the broadest possible sense. Assets include human produced items such as machinery, buildings and roads (produced capital), the capacity of individuals to contribute to society (human capital), the capacity of our social systems to facilitate interactions (social capital) and the capacity of our natural resources to meet our needs – both tangible and intangible (natural capital). Sustainable development is interpreted as the situation where the overall value of our assets continues to increase over time. The theoretical justification for this interpretation is provided by Hamilton and Atkinson (2006) and aligns with the concept of inclusive wealth (Arrow Dasgupta and Maler 2003, Dasgupta and Maler 2001).

Sustainable development and ESD are treated as equivalent terms although it could be argued that the definition of ESD places additional requirements on maintaining ecological processes. The *Signposts* framework caters for either view.

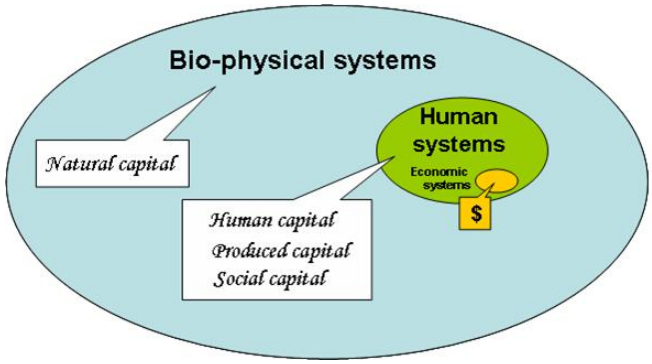

Figure 1. Economic systems, social systems and bio-physical systems with their associated capital assets.

An agricultural industry, or any other subject for that matter, contributes to sustainable development by adding to the value of some of our assets and reducing the value of others.

The *Signposts* framework recognises that an industry 'holds' some capital assets as well as adding to and subtracting from the capital assets 'held' by others. The contributions of an industry to sustainable development are measured in terms of the change in value of the industry's assets (stocks) plus the value of the contributions it makes to assets held by others (flows). Assigning an asset to the industry has the effect of holding the industry responsible for the condition of that asset, that is, it implies a stewardship role. The contributions of the industry to ESD are measured in terms of the change in the value of that asset even though some of those changes may be due to external factors beyond the industry's control. For example, agricultural industries are held accountable for the condition of the land they manage despite the impact of favourable or unfavourable weather or the actions of their neighbours. The industry is expected to adjust its practices to deal with these externalities. This situation is analogous to a financial manager who is expected to obtain positive outcomes for clients despite the vagaries of financial markets.

For assets not assigned to the industry, the contribution of the industry to ESD is measured by the industry-specific flow to or from that asset. For example, it would not be sensible to assign the atmosphere to the dairy industry and measure the industry's performance in terms of changes in the condition of the atmosphere. Instead, the contribution of the dairy industry to the atmosphere is measured in terms of what the industry emits to or absorbs from the atmosphere.

The distinction between assets held by the industry and the impact of the industry on assets held by others is discussed in more detail in Appendix D. The distinction is particularly useful because it provides a direct link between frameworks such as *Signposts* that are concerned with the achievement of sustainable development and frameworks such as the National Natural Resource Management Monitoring and Evaluation Framework that focus on asset condition.

Flexibility

Everything that has been described so far can be applied to any subject - an agricultural industry, a mining industry, a business, a region, or an individual. The next step, unpacking the contributions into their components, is tailored to the particular subject and its mix of stocks and flows. In *Signposts,* the contributions are first divided into three components: contributions to economic systems, contributions to social systems and contributions to bio-physical systems. This 'triple-bottom line' subdivision is a direct response to stakeholder input during the development of the Grains Industry Profile. Each of these three initial components is then divided into assets held by the industry (stocks) and contributions to assets held beyond the industry (flows) giving the 'component tree' shown in Figure 2.

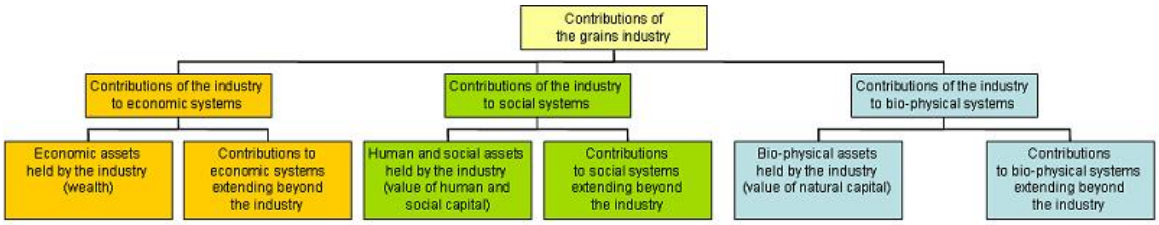

Figure 2: Major components of the *Signposts* framework.

The components in the tree are then further sub-divided as required to cover all issues of interest relevant to the industry. The evolution of the component tree and its current form (Figure 3) are documented in Appendix E. Further evolution is expected and encouraged although it appears that the higher level components are now relatively stable. The higher level components of the framework provide a level of consistency across different industries. Flexibility in the lower level components allows each industry to tailor the framework to suit their specific needs.

The net result of the contributions across all industries and activities over time determines whether sustainable development is being achieved. A large amount of literature is devoted to how one might value different types of assets in order to make the ultimate calculation. However, it is possible to inform many decisions without having to do this. In particular, for an agricultural industry that typically provides a mix of positive and negative contributions, it is possible to measure impacts and identify actions that are expected to have a net positive result without necessarily reducing every impact to a common unit of measurement or using the same measurement on every occasion. Rather than aggregate to a single summary measurement, the aim of *Signposts* is to unpack the components of sustainable development to the point at which they connect with particular policy and management decisions.

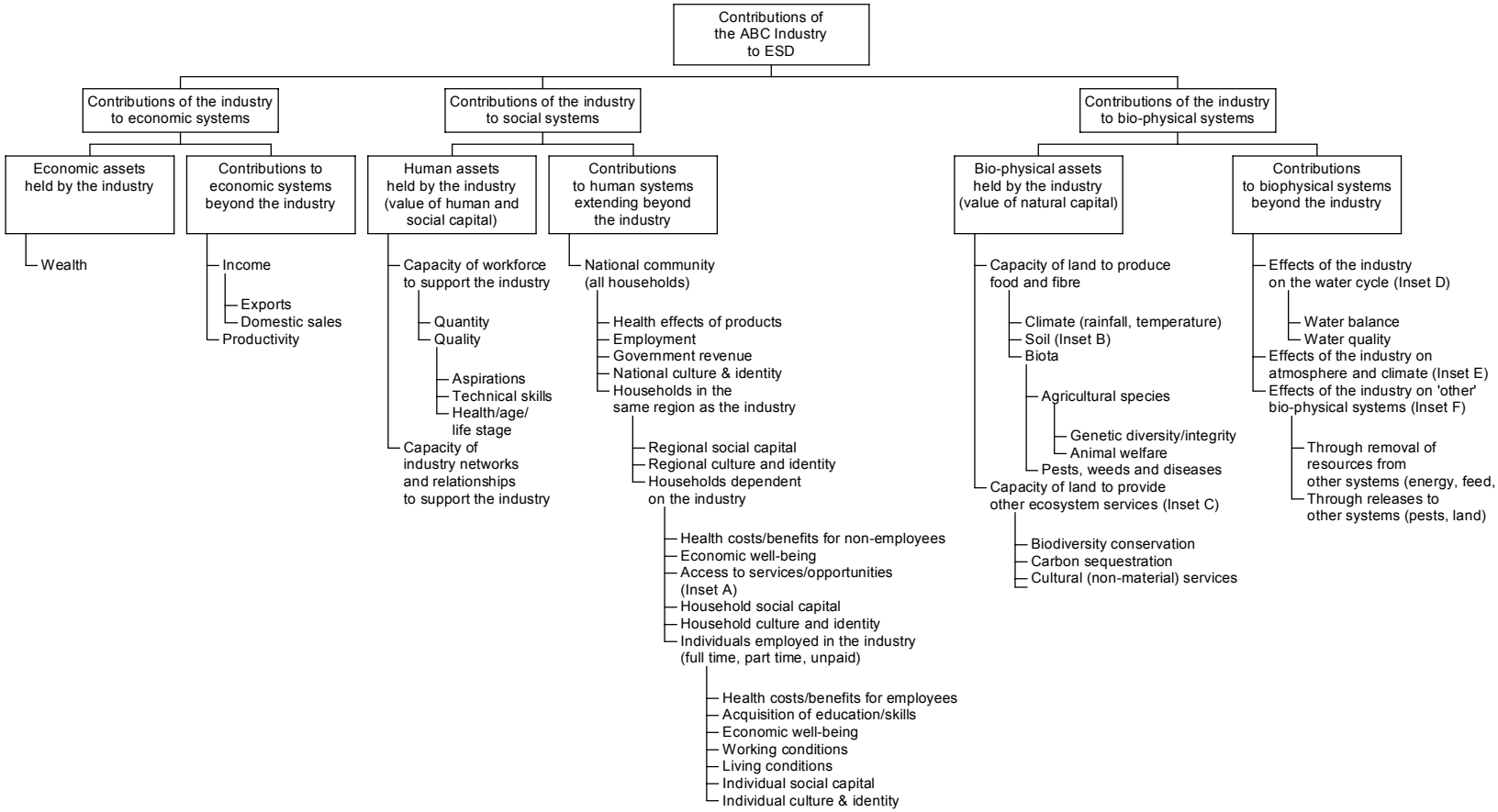

Figure 3. Components of the Signposts for Australian Agriculture Generic Component Tree Version 3. The insets are given in Appendix E.

The hierarchical structure of *Signposts* provides the flexibility to report at different levels of aggregation to suit different needs. For example, whereas a summary report card might report aggregated results for each of the six components at the third level of the tree (condition of assets and contributions to assets held by others), a report on condition of agricultural land might use an aggregated soil condition index, and an analysis of adoption of management practices might report at the level of individual soil components such as salinity and acidity.

Outcome focussed

Each component contains the elements listed in

Table 1. 'Populating' the *Signposts* Framework refers to the identification and documentation of these elements. Specifying the desired outcome is the first and most important step as each of the other elements is dependent on it. The *Signposts* framework is defined by its components and desired outcomes, not by the indicators that may be used to measure achievement of the desired outcomes. This distinguishes *Signposts* from other 'indicator frameworks' that are defined by their indicators. Within *Signposts,* indicators are expected to change as superior ones become available, or indicators may not yet exist for some components. When an indicator does exist, data may or may not be available to populate the 'results.' The decision to fill data gaps will depend on the importance of that component for decision making.

Table 1. Content of each component of the Signposts for Australian Agriculture Framework.

Element	Description
Desired outcome	An outcome or objective against which an industry's contribution to ESD is to be evaluated. The desired outcome can be expressed as an objective, criterion or an attribute of success. The aim is to repeatedly subdivide components until the desired outcome qualifies as an operational objective – an objective that has a practical interpretation that can be measured.
Indicator	A quantity that can be measured directly and used to track changes over time with respect to an operational objective.
Summary measure	A function that translates a value of an indicator to a quantitative measure of performance with respect to a desired outcome. In *Signposts,* summary measures are used to show the degree to which the desired outcome is being achieved on a scale of 0 to 1.
Results	Actual values of the indicator and summary measure in both

	time and space to the extent that data are available.
Responses	Management practices and other actions that are or could be taken to achieve the desired outcome.
Interactions with other components	Other components of the *Signposts* framework that could influence or be influenced by this component.
External drivers	Factors outside the *Signposts* framework that could affect achievement of the desired outcome.

Linkage of outcomes with responses

The *Signposts* framework also contains the concept of pathways linking particular responses, (policy decisions of government, investments by research and development corporations or management practices) through intermediate outcomes to the achievement of the desired outcomes articulated for each component in the component tree (Figure 4). The darker components in the horizontal dimension represent the contributions of an industry to ESD. The lighter components in the vertical dimension represent short-term or intermediate outcomes that form a pathway to those contributions as expressed by program logic (Owen 1993, Funnell 1997). These intermediate outcomes include the level of adoption of business and natural resource management practices.

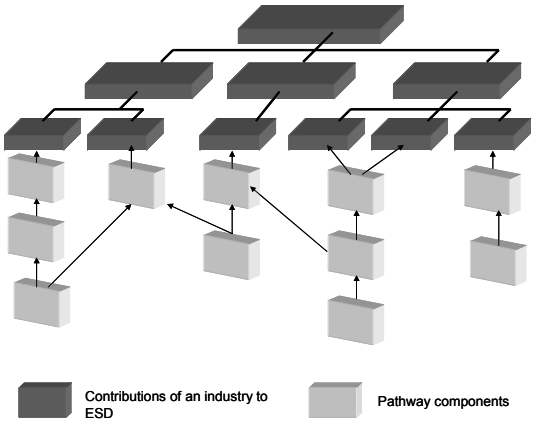

Figure 4. Relationship between the contributions of an industry to ESD and management responses or intermediate outcomes.

Four major types of pathways have been identified (Kilpatrick and Guenther 2005):

- Moral suasion pathway
- Market intervention pathway
- Incentives pathway
- Regulatory pathway.

A program logic diagram for the moral suasion pathway is shown in Figure 5. Rather than developing each of these further it was agreed that *Signposts* would initially focus on the inclusion of management practices which are an important step in many if not most pathways involving agriculture (Chesson et al 2005). The Grains Industry Profile shows how information on the adoption of specific natural resource management practices can be linked with relevant components of the component tree so that users can move easily between the two dimensions in Figure 4 (http://www.signposts4ag.com/signposts-grains/management-practices).

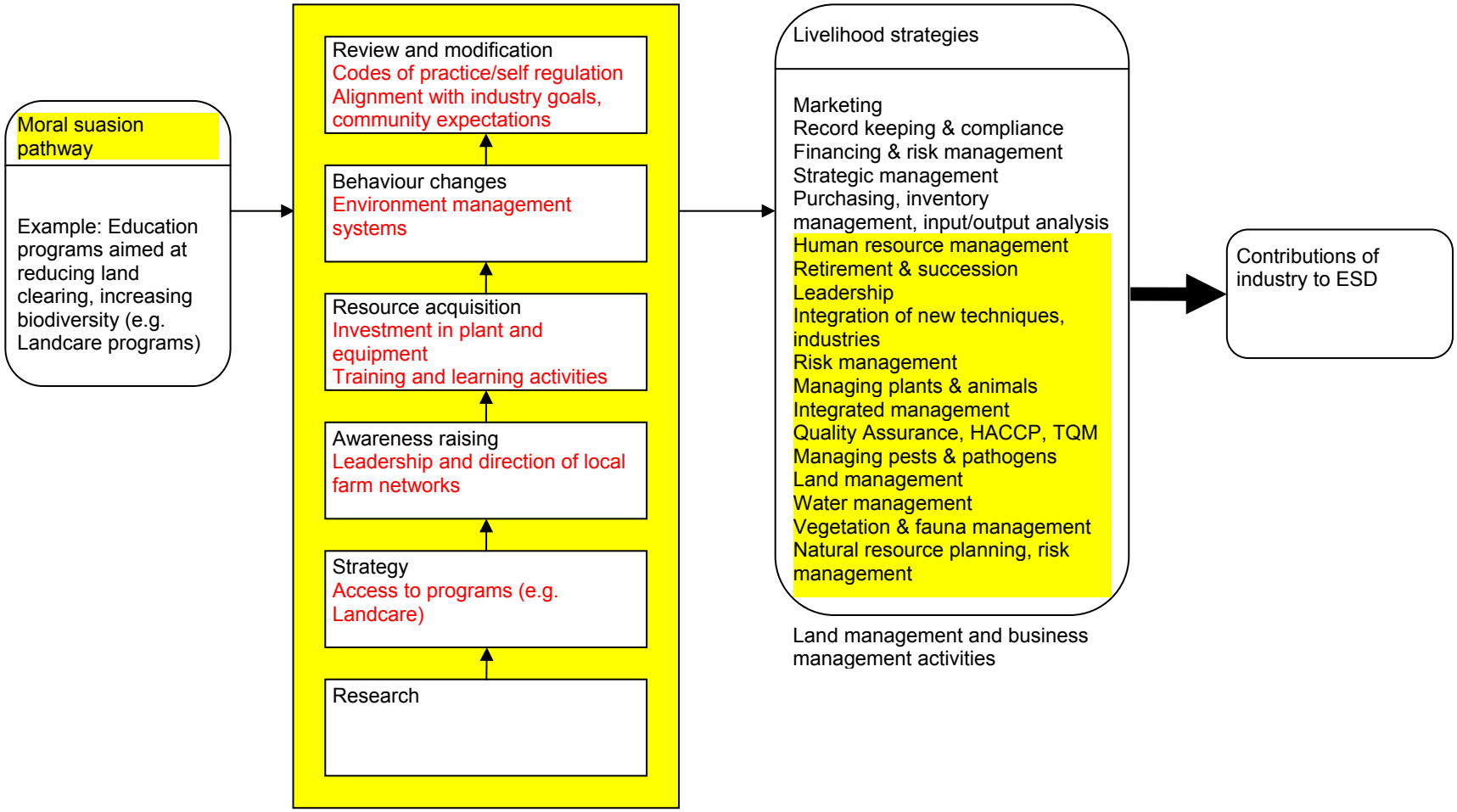

Figure 5. Example of a program logic diagram for a moral suasion pathway (Kilpatrick and Guenther 2005).

Relationships to other frameworks

The *Signposts* framework is a performance evaluation framework. It is distinguished from many other frameworks by the nature of its subject - an industry rather than a program, a geographical area or a particular resource. It is also distinguished from many other frameworks by its scope – economic, social and environmental and by the performance question it asks – 'How does an agricultural industry contribute to ESD?'

Signposts has been designed to complement or link with other relevant frameworks. It makes an explicit distinction between assets held by the industry and assets held by others so that it can link directly to other frameworks concerned with asset condition such as 'state of environment' reporting. In particular, *Signposts* addresses the matters for target of the National NRM Monitoring & Evaluation Framework and adopts the recommended indicators wherever feasible so that the information reported under *Signposts* for assets held by the industry can be incorporated into regional and national reporting of resource condition (Appendix B). Relationships to some other frameworks are listed in Appendix F.

Signposts uses an extended version of the pressure-state-response (PSR) model where 'state' is interpreted as both the state of the assets held by the industry *and* the impact of the industry on the assets held by others. This extension, together with the broad economic, social and environmental scope, allows *Signposts* to adopt a proactive view (how can we continue to make things better?) rather than the reactive view often associated with PSR (we must respond to pressures that are moving us from a previous, more desirable state).

Uses, uncertainties and limitations

The *Signposts for Australian Agriculture* framework is a structured way of thinking about an agricultural industry. It can be used in a variety of ways to support different types of decision making (Table 2). Depending on the use, not all components need to be considered and/or not all elements of a component need to be populated. For example, the framework structure can be used as a basis for modelling future policy or management options without necessarily having populated the 'results' element with indicator values.

Table 2. Uses of the *Signposts* framework

Use	**Elements of the framework that are required**
Communication and consultation Organisation of ideas	Component tree
Understanding and alignment of existing policies, strategies and initiatives. Identification of policy gaps.	Desired outcomes for one or more components

Reporting on performance - in space - in time Identifying components where action is required Identifying data gaps	Desired outcomes Values of indicators and summary measures - in space - in time
Evaluating options for future action	Component tree Desired outcomes Ability to predict outcomes (modelling) Ability to aggregate and make trade-offs among components
Evaluating the effectiveness of actions that have been taken	Desired outcome Values of indicators and summary measures before and after the action

The intended use can influence the way in which the framework is applied. This is probably the major uncertainty in terms of establishing and maintaining a process of enduring value. For example, if the primary purpose is to document improvement in industry performance over time, the framework would be tailored to the needs of that industry, its specific desired outcomes and the indicators best suited to measure performance against those outcomes. Indicators are more likely to be expressed in relative rather than absolute quantities. In contrast, if the primary purpose is to compare one industry with another or to combine the results from more than one industry, the framework would need to be more standardised, the desired outcomes would be the same across all industries and indicators are more likely to be expressed in absolute quantities. The extension of the environmental components of the *Signposts* framework to the food value chain is an example of the latter case. The indicators are primarily absolute quantities of water, energy, etc that can be readily combined across different sectors.

The component tree is not a model of a system. It is simply a structured list of the more important contributions of an industry to ESD. It is a statement of what we would like to know about, either by measuring what has already happened or by modelling what might happen in the future. It can inform and guide the development of monitoring programs and the construction of models, but it does not replace them.

For uses that require data (eg reporting), the availability of appropriate data is a major limitation. However, Signposts is a useful first step in ensuring investments in data collection are based upon a structured needs analysis. In addition, experience with industry profiles to date has revealed a large amount of currently underutilised information that can be brought together and made more accessible through the framework.

The *Signposts* for Australian Agriculture framework has been designed for Australian agricultural industries. Applying the same approach to another type of subject such as a region or a program results in a different component tree with a different assignment of assets but the underlying principles are the same (Chesson 2004). Where assets overlap, such as when the land held by an agricultural industry makes up part of a region, two frameworks can share some common measurement processes.

Industry Profiles

The three industries selected for Stage 3a of *Signposts* are:

- Beef
- Dairy
- Horticulture (fruit, nuts and vegetables)

They are in addition to the Grains Industry Profile developed by BRS in 2005. The sub-industries included within each of these industries are the same as those specified by the relevant Research and Development Corporation (Meat & Livestock Australia, Dairy Australia and Horticulture Australia Limited respectively). Horticulture excludes wine grapes. Table grapes are also excluded unless specifically noted otherwise. For further elaboration refer to the Specifications Paper in Appendix A.

Component trees

The components of each industry profile have been based upon the generic component tree developed in *Signposts* Stage 2 and updated from knowledge gained during development of the Grains Industry Profile and through commissioned reviews (Schirmer 2006, Williamson 2006). The components and their arrangement into a component tree have been adjusted to suit the needs of each industry. Draft component trees were presented at a May 2006 workshop and comments were sought from research and development corporations and other stakeholders.

Development and status of the industry profiles

The industry profiles are housed at www.signpost4ag.com (Figure 6). They are electronic hyperlinked documents where users can view the content of any component and navigate between components. The Grains Industry Profile is publicly available. Access to the other three profiles is restricted while the content is reviewed by stakeholders.

Figure 6. Front page of the Signposts website: www.signposts4ag.com.

Grains

BRS developed the Grains Industry Profile as a demonstration of a *Signposts* information product. The profile was launched by the Honourable Sussan Ley MP at 'Grains Week' in April 2006.

The Grains Industry Profile uses the Plone® content management system (CMS). The CMS can also be used as an intranet and extranet server, a document publishing system, portal server and a collaboration tool. A content management system was necessary to manage the large amount of information of variable formats and types in the Grains Industry Profile. Users can view the content of any component and navigate among components. They can also post feedback and comment.

The Grains Industry Profile was developed with input from the Audit to ensure the profile would be applicable to future industry profiles. The graphical interface and portlets were developed specifically to suit the needs of the Audit, allowing users quick and seamless transition to the Audit website and vice versa, and provide a standard 'look and feel'.

Since the release of the Grains Industry Profile in April 2006 components and management practices have been updated as follows:

- Formatting and layout has been improved, with assistance from IT Graphics consultants.
- All soils information has been reported by National Action Plan (NAP) and Natural Heritage Trust (NHT) regions as well as Grains Research and Development Corporation (GRDC) zones.
- The weeds map has been completed and biodiversity conservation map has been updated.
- Further work has been carried out on nutrient and sediment input into rivers with help from the Commonwealth Scientific and Industrial Research Organisation (CSIRO).
- Water balance and greenhouse gas emissions are being developed with assistance from BRS and external experts.

Continued development and testing through the BRS project 'Scientific Support for Signposts' has resulted in the following enhancements to all four industry profiles:

- improved accessibility to individual pages through an updated component tree structure and individual webpage addresses (allowing book marking),
- new domain names to make the industry profiles easier to search and locate on the Web,
- improved presentation of graphics (including maps, charts, figures, and tables),
- improved graphical interface, formatting of text, and webpage view.

Beef, Dairy and Horticulture

A significant step in the development of an industry profile is determining the spatial extent of an industry. The aim is to develop a mask that can be used to obtain industry-specific information from national maps of soil, vegetation, etc. BRS has worked closely with the Audit to determine the spatial extent of the beef, dairy and horticulture industries using national and catchment scale land use maps with input from agricultural and industry experts. Working masks have been developed for all three industries but refinements are continuing. The ideal mask represents the land that is under the management of the industry, not just the land actually grazed or sown. The development of the spatial extent of each industry, the challenges and the lessons learned will be documented in a separate report.

Each of the beef, dairy and horticulture profiles has 29 active components populated with information. Of these, 10 have detailed indicator values and summary measures in the beef profile, 7 in the horticulture profile and 9 in the dairy profile. They are listed in Table 3. Examples are shown in Figures 7 and 8.

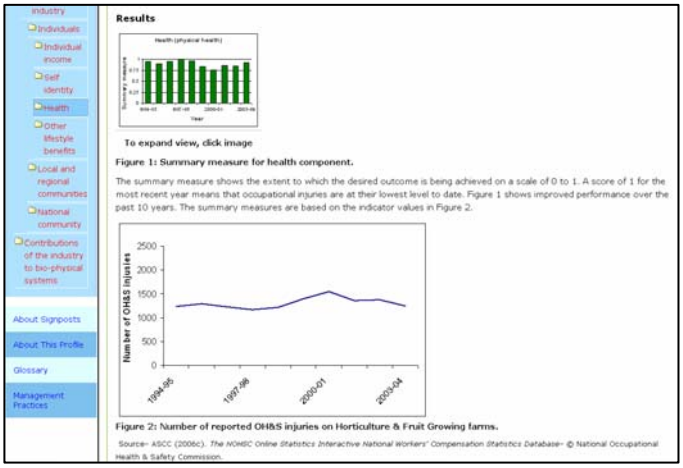

Figure 7. The summary measure and indicator values for the 'health' component of the dairy profile.

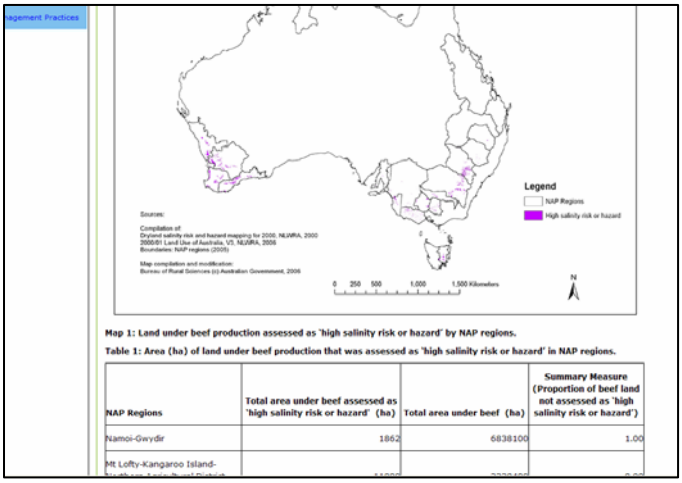

Figure 8. Indicator values for soil salinity in the beef profile.

In addition to the outcome components depicted in the component trees, each electronic industry profile includes information on specific management practices (Table 4).

An example page is shown in Figure 9. The management practice pages are hyperlinked to the relevant outcome components and the outcome components are linked to relevant management practices providing 'many to many' cross referencing. Additional management practices for the dairy profile relating to soil management and irrigation are near completion.

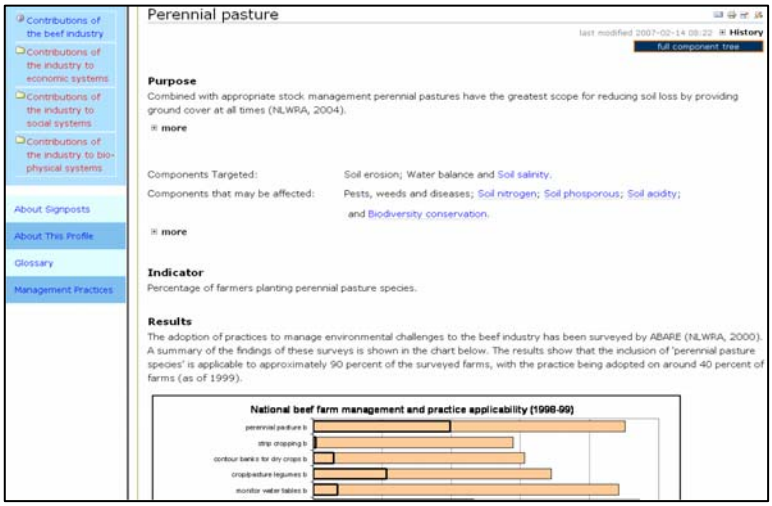

Figure 9. Part of a management practice page – planting of perennial pasture in the beef industry.

Table 3. Components currently populated in each of the industry profiles*[1].

Grains	**Beef**	**Dairy**	**Horticulture**
With description, desired outcome, indicator and summary measure, responses and external drivers	*With description, desired outcome, indicator and summary measure, responses and external drivers*	*With description, desired outcome, indicator and summary measure, responses and external drivers*	*With description, desired outcome, indicator and summary measure, responses and external drivers*
Individuals (Contributions to social systems extending beyond the industry)	Individuals (Contributions to social systems extending beyond the industry)	Individuals (Contributions to social systems extending beyond the industry)	Productivity
Local and regional communities (Contributions to social systems extending beyond the industry)	Local and regional communities	Local and regional communities	Individuals (Contributions to social systems extending beyond the industry)
Capacity of land to produce food and fibre	Empoyment	Empoyment	Local and regional communities
Soil	Capacity of land to produce food and fibre	Capacity of land to produce food and fibre	Empoyment
Capacity of land to provide other eco-system services	Soil	Soil	Capacity of land to produce food and fibre
Effects of the industry on the water cycle	Capacity of land to provide other eco-system services	Capacity of land to provide other eco-system services	Soil
Water quality	Effects of the industry on the water cycle	Biodiversity conservation	Capacity of land to provide other eco-system services
With above plus values of indicator and summary measure	Water quality	Effects of the industry on the water cycle	Biodiversity conservation
Wealth	Surface water - nitrogen	Water quality	Effects of the industry on the water cycle
National income	Surface water – phosphorous	Surface water - nitrogen	Water quality
Exports		Surface water – phosphorous	Surface water - salinity
Productivity	*With above plus values of indicator and summary measure*		Ground water – salinity
Health	Wealth	*With above plus values of indicator and summary measure*	
Employment	National income	National income	*With above plus values of indicator and summary measure*
Soil salinity	Exports	Exports	National income
Soil acidity	Productivity	Productivity	Exports
Soil nitrogen	Health	Health	Health
Soil phosphorous	Soil salinity	Soil salinity	Soil salinity
Biodiversity conservation	Soil acidity	Soil acidity	Soil acidity
Surface water - nitrogen	Soil nitrogen	Soil nitrogen	Soil nitrogen
Surface water – phosphorous	Soil phosphorous	Soil phosphorous	Soil phosphorous
	Biodiversity conservation		

[1] The table excludes 9 high level components that are populated with generic text in all four profiles.

Table 4. Management practices currently included within each of the industry profiles.

Grains	Beef	Dairy	Horticulture
Control feral animals or weeds	Capping and piping of artesian bores	Contour banks	Fertilising- nitrogen
Controlled traffic systems	Control of feral animals or weeds	Effluent management: pond collection systems	Fertilising- phosphorous
Deep-rooted legumes	Contour banks in dryland cropping	Fertilising- nitrogen	Fertilising-potassium
Dryland cropping using contour banks	Deep rooted legumes	Fertilising- phosphorous	Control of pest animals or weeds*
Fertilising- nitrogen	Fertilising- nitrogen	Liming	Controlled traffic systems*
Fertilising- phosphorous	Fertilising- phosphorous	Maintain areas of conservation significance	Contour banks in dryland cropping*
Fertilising- potassium	Liming	Management of riparian areas	Deep-rooted legumes*
Liming	Maintain areas of conservation significance	Regularly monitor water tables	Liming*
Maintain areas of conservation significance	Maintain cover along drainage lines	Vegetation establishment	Maintain areas of conservation significance*
Maintain cover along drainage lines	Perennial pasture		Maintain cover along drainage lines*
Growing of vegetation along drainage lines.	Regularly monitor water tables		Minimum tillage and direct drilling*
Minimum tillage and direct drilling	Soil testing		Monitor water quality*
Monitor water quality	Strip cropping		Regularly monitor water tables*
Regularly monitor water tables	Vegetation establishment		Soil testing*
Soil testing			Strip cropping*
Strip cropping			Vegetation establishment*
Vegetation establishment			*General information only, no industry specific data.

Consultation Process

The ongoing development of the *Signposts* framework and the production of industry profiles have used the following means of consultation:

- Direct consultation with RDCs, industry groups and subject matter experts
- Workshops
- Reference Groups
- Commissioned reviews
- Online comments

Each of these is described below with respect to Stage 3a of the *Signposts* project.

Direct consultation

In developing the Grains Industry Profile, information was provided and products reviewed by specialists across BRS, the Audit, the Grains Research and Development Corporation, the Grains Council of Australia and other stakeholders. Prior to public release, drafts were provided to representatives from these institutions for comment. The same process is being employed with the beef, dairy and horticulture profiles. Representatives from Meat and Livestock Australia (MLA), Dairy Australia and Horticulture Australia Limited have provided material on industry policies, environmental studies and other relevant information. The spatial extent of the beef industry was developed with input from MLA. Password restricted access will be provided to the RDCs and other nominated stakeholders to review components and management practices with the aim of achieving agreement for public release by June 2007. The details of this consultation process will be set out in a consultation plan being developed as part of *Signposts* Stage 4.

Workshops

The Stage 3 workshop was held on 16 May 2006. The workshop attendees and major recommendations are provided in Appendix G.

The objectives of the workshops were to:

1. Update stakeholders on refinements to component trees as part of the *Signposts* framework
2. Demonstrate the Grains Profile Website as a layout for the new industry profile websites
3. Report on progress with respect to Stage 3 of the project.
4. Seek feedback on work to date and seek comments from stakeholders on the data used and/or stakeholders to provide additional data sources.

An important issue raised by RDC representatives at the workshop was the need for time for them to consult with their organisations and stakeholders. This led to an agreement to extend timelines and to develop a consultation plan.

Reference Groups

The Grains Industry Profile was developed under the guidance of a reference group of key stakeholder representatives set up by BRS.

In September 2005 the Primary Industries Standing Committee (PISC) endorsed PISC involvement in a Reference Group designed to refine the project's objectives and foster better understanding and support amongst stakeholders.

Terms of reference, a list of members and major recommendations of the *Signposts for Australian Agriculture* Reference Group are provided in Appendix H.

Commissioned Reviews

As part of Stage 2 of the *Signposts* project, the Audit commissioned a review of what was then the 'human systems' branch of the framework. (ABARE 2005). The responses to this review are documented in the Stage 2 report (Chesson et al 2005). BRS commissioned a review of the social components of the *Signposts* framework (Schirmer 2006) as part of its Keystone Project 'Measuring the contributions of portfolio industries to ecologically sustainable development.' In Stage 3c of the *Signposts* project, the Audit commissioned the ABS to further review and populate the *Signposts* framework. Appendix E documents how the findings of these reviews have been incorporated into the *Signposts* framework.

Online comments

The Grains Industry Profile allows registered users to comment on the content, format or any other aspects of each page. The website authors and administrators can post responses forming comment discussion threads (the user can further respond to the authors posted comment and so on). Several users have posted comments on the Grains Profile dealing mainly with general formatting issues but also with some of the content.

Under Stage 4, selected reviewers including the RDC and industry representatives mentioned above, will be given access to pages of the new industry profiles to review content and check functionality before public release. The reviewers will have the option of placing their comments directly on the website.

Conclusions and Recommendations

Stage 3a of *Signposts* has achieved its project objectives:

- Material has been collated from previous reports and other sources to provide a comprehensive description of the principles underpinning the development of the *Signposts* framework. This material will have a variety of uses including the updating of the 'About Signposts' page on the website and as a source of background information for the hard copy summary reports planned under Stage 4.

- The website www.signposts4ag.com now houses electronic profiles for the grains, beef, dairy and horticulture industries. The grains profile is publicly available. The other three profiles are password protected. Each profile has 29 active components. A total of 39 components (13 for grains, 10 for beef, 9 for dairy and 7 for horticulture) have detailed results for indicator values and summary measures. In addition, the profiles contain information on a total of 56 management practices (17 for grains, 14 for beef, 9 for dairy and 16 for horticulture) with a number of others close to completion. The profiles have been developed with input from RDC, government and other stakeholders through direct consultation, a workshop, reference groups, commissioned reviews and online comments.

There is, however, a requirement for ongoing consultation. The workshop recognised that RDCs required more time to consult with their stakeholders and the timelines for Stage 3 were extended to accommodate this. Difficulties in determining the spatial extent of each industry have meant that bio-physical components have only recently reached a point where review is useful. Therefore it is recommended that a final review of the content of the beef, dairy and horticulture profiles occurs in Stage 4 according to an agreed consultation plan setting out the processes and timelines to be followed. The plan needs to allow RDCs and other stakeholders adequate opportunity to review material without being unduly burdensome.

In addition to addressing its two main objectives Stage 3a has also updated the *Signposts* component tree based on recommendations from two commissioned reviews and produced three issues papers.

The ability of the *Signposts* framework to incorporate recommendations from a series of reviews while maintaining its overall conceptual framework suggests that the basic approach is robust. The Grains Industry Profile has formed a firm foundation for the development of three more industry profiles and all four profiles continue to benefit from the lessons learned. The goal of having an evolving framework that improves over time appears to be achievable.

Within the framework there are still considerable challenges, both in elucidating appropriate components, specifying the desired outcome and identifying appropriate indicators to measure achievement of that outcome. Even when this is achieved to

everyone's satisfaction, the availability of appropriate data in space and time, remains a major limitation. This however is a strength of *Signposts*, as it forms the basis for a structured needs analysis and assists in the prioritisation and coordination of future data collection.

There are also challenges in promoting understanding of the *Signposts* framework – what it can do and what it cannot and how it can be used for a variety of purposes. The creation of demonstration products such as the industry profiles is a major contribution to meeting these challenges.

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Kilpatrick, S. and Guenther J. (2005) Pathways to ESD outcomes through livelihood strategies. In Chesson, J. Whitworth, B. Stewart, J & Yapp, G. (2005). Signposts for Australian Agriculture: Stage 2a: Refinement of preliminary framework and industry profiles to include pathways to ESD. National Land and Water Resources Audit, September 2005, Canberra.

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Schirmer, J. (2006) Signposts for Australian Agriculture - Review of social components of the framework. Prepared for the bureau of Rural sciences (Draft), School of Resources, Environment and Society, Australian National University, Canberra.

Williamson, J. (2006). Review and populate the stage 3 framework (ABS 5). Prepared for the Bureau of Rural Sciences (Draft), Australian Bureau of Statistics, Canberra.

Appendix A: Specifications Paper

This paper was developed at the beginning of the project to specify which components were expected to be populated and the likely sources of data for both outcomes and management practices.

Signposts for Australian Agriculture

Specifications Paper: Content of the Signposts Industry Profiles, data availability and sources

Benj Whitworth and David Carlisle

May 2006

Introduction

The aim of the Signposts for Australian Agriculture project is to provide a consistent national framework for gathering and analysing agricultural and natural resource management information. The reasons for gathering and analysing this information include, but are not limited to:

- Reporting in a balanced way on the contribution of agriculture to Australia's economic, social and environmental well-being, using an evidence-based approach
- Identifying agriculture's future challenges and opportunities
- Enabling agricultural industries to demonstrate and communicate 'clean and green' credentials in the market place and to the community in accord with a consistent national approach
- Assisting in the evaluation of the impact of proposed and actual policy interventions so as to identify priorities for better targeting government policy, programme and R&D investments.

The *Signposts for Australian Agriculture* project commenced in April 2004. Stage 1 of the project developed a pilot framework and associated outcome statements and indicators for measuring the contribution of agricultural industries to ecologically sustainable development (ESD), together with initial web based/CD profiles of selected agricultural industries. Stage 2 of the project used the results of the initial pilot to expand the framework to incorporate intermediate outcomes, the adoption of management practices, and reviewed the economic and social components of the *Signposts* framework and provide recommendations on alternative outcome statements and associated indicators for inclusion.

Signposts Stage 3a is being undertaken by BRS and will further expand three of the industry profiles (Dairy, Meat and Horticulture) in consultation with Research and Development Corporations (RDC), government and research stakeholders, and present them in a hyperlink enabled web based / CD report and hard copy form. This Paper sets out the expected content of the Signposts Industry Profiles, in order to identify data availability and sources to populate the Profiles.

Content of industry profiles

Subject

The Signposts for Australian Agriculture project was created to develop a consistent and credible framework for reporting on the contributions of Australia's agricultural industries to our total quality of life. For Signposts Stage 1 the chosen subject was an agricultural industry. This decision was made for practical and jurisdictional reasons. Identifying and measuring contributions to ESD for any subject is a complex undertaking. From a jurisdictional perspective, the Department of Agriculture and Fisheries and the associated

RDCs have a major interest in the primary production sector, especially in terms of natural resource management.

Signposts Stage 3 will continue with this approach and further expand three agricultural industry profiles in consultation with RDC, government and research stakeholders and present them in a hyperlinked web-based form. The industries are:

- Dairy,
- Horticulture (Fruit and Vegetables)
- Beef

The sub-industries included within each of these industries are as specified by the relevant Research and Development Corporation, these being: Dairy Australia, Horticulture Australia Limited, and Meat and Livestock Australia, respectively. For further elaboration refer to Appendix 1.

Scope

The choice of subject is separate from the decision on scope. For Signposts Stage 1 the scope was specified as all social, economic and environmental contributions, positive and negative, short and long term. Many of these contributions will be to systems far beyond the farm gate. The direct contributions include contributions to rural communities through employment and social capital and contributions to bio-physical systems through emissions into air and water that may extend far beyond the farm gate. The direct contributions do not include the additional contributions to rural communities provided through the existence of a flour mill or a flour mill's emissions to air or water. These are included in the down chain contributions. The only explicit restriction was the exclusion of contributions beyond Australia.

The components of ESD for the 3 Signposts Stage 3 agricultural industries will be the same as those developed for the Grains Industry Profile (Figure 1). These components and their arrangement into a component 'tree' will provide the base component tree, which can be adjusted to suit the needs of specific industries.

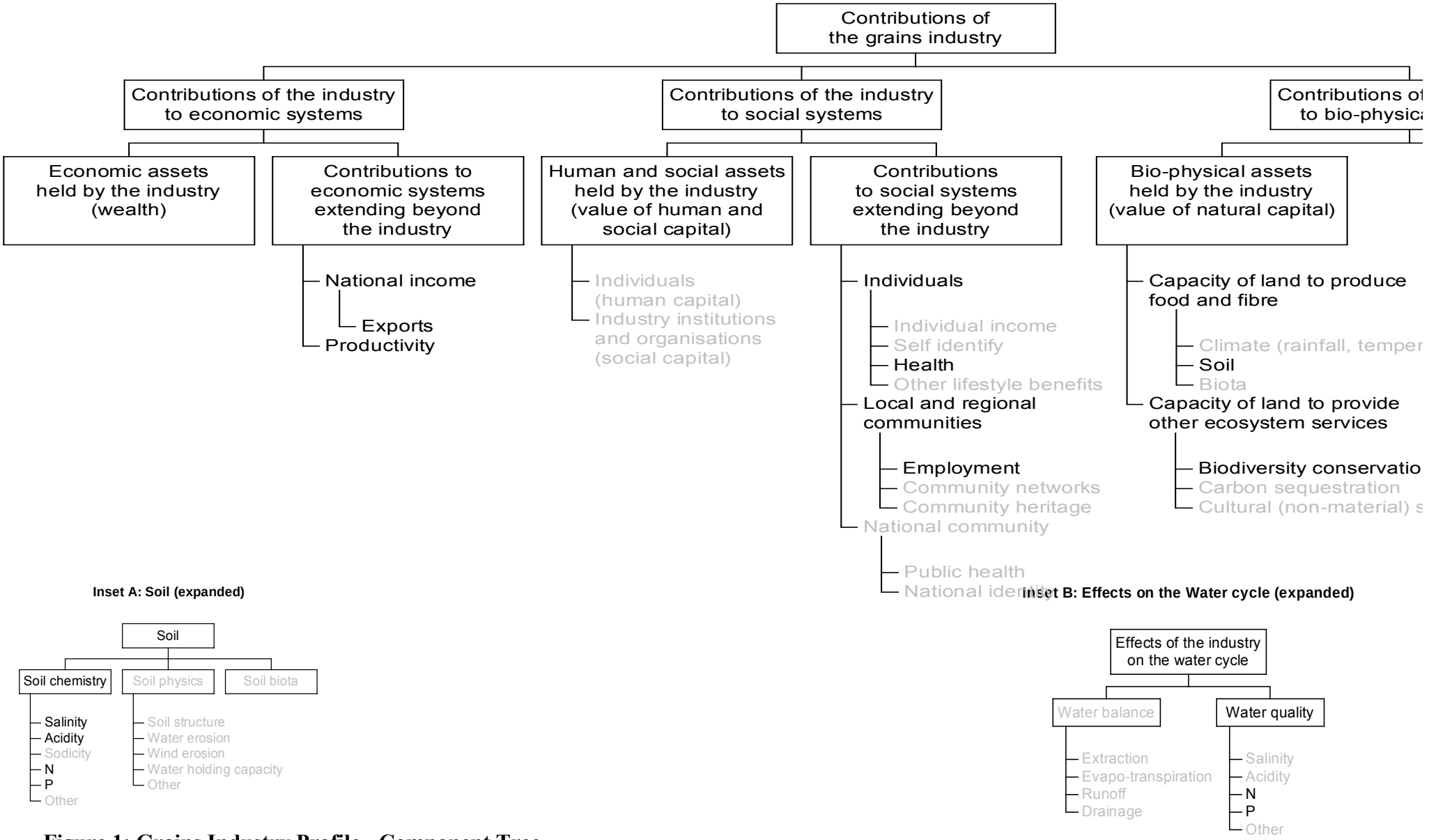

Figure 1: Grains Industry Profile - Component Tree

Components selected for populating with data

The profile for each agricultural industry will be populated using data held by the Audit, the Department of Agriculture Fisheries and Forestry, the Australian Bureau of Statistics, and Research and Development Corporations. Table 1 provides a list of components, for the selected agricultural industries, their currently known potential for data/information, and the expected sources of data for that component.

Table 1: Components expected to be populated with data

Component	Data Source	Dairy	Horticulture	Beef
Economic systems				
Wealth	A_1	√	X? ABS	√
Income	A_1	√	X?	√
Exports	A_2	√	√	√
Productivity	A_1	√	check	√
Social systems				
Demography	ABS_1	√	√	√
Education/skills	ABS_1/ A_1	√	√	√
Individual income	A_1	√	?	√
Health	NOSI	√	√	half (≡grain)
Employment	ABS_1	√	√	? caveat -split
Biophysical systems				
Soil	NLWRA	Surveys industry+ABARE	Industry info	?
Biodiversity conservation	BRS/ABS_2/A_1/NLWRA	√	?	√
Water - quality	NLWRA	√	?	?
Water - quantity	ABS_3/States	Industry monitoring	√	X?
Greenhouse gas emissions	AGO	√	X Possibly modelled	√

Sources

A_1 = ABARE Farm Surveys and Resource Management Surveys

A_2 = ABARE Commodity Statistics Series

ABS_1 = ABS Census of Population and Housing

ABS_2 = AgStats

ABS_3 =Water accounts

AGO = Australian Greenhouse Office

NLWRA=National Land & Water Resources Audit

NOSI = National Occupational Health and Safety dataset

Components selected for further investigation and development

The following components have been identified as highest priority for further investigation and development, due to probable availability of data and importance to clients and stakeholders:

- Social
    - Health – Human capital,
    - Institutions,
    - Self identity,
- Bio physical
    - Climate,
    - Weeds,
    - Diseases,
    - Agricultural species- varieties

Regions selected for reporting

The suggested reporting regions and potential data reporting scale for Signposts Stage 3a (under development with Vivienne Bordas) are shown in Table 2.

Table 2: Reporting regions and data reporting scale for agricultural industries

Component	Grains		Dairy		Horticulture		Beef	
	Regions	Smallest area data reported by	Regions	Smallest area data reported by	Regions	Smallest area data reported by	Regions	Smallest area data reported by
Economic systems								
Wealth	Australia	Australia/ABARE Regions	Australia	Australia/ABARE Regions	Australia	GVP- A2	Australia	Australia/ABARE Regions
Income	Australia	Australia	Australia	Australia/States	As above	As above	Australia	Australia/States
Exports	Australia	Australia	Australia	Australia	Australia	Australia	Australia	Australia
Productivity	Australia	Australia	Australia	Australia	?	?	Australia	Australia
Social systems								
Demography	Australia/GRDC Zones	SLA	Australia/Dairy regions	If SLA	Australia/State/SLA	SLA	Australia/State	SLA
Education/skills	Australia/GRDC Zones	SLA	Australia/Dairy regions	If SLA	Australia/State/SLA	SLA	Australia/State	SLA
Individual income	Australia/ABARE Regions	ABARE Regions	Australia/ABARE Regions	ABARE Regions	?	?	Australia/ABARE Regions	ABARE Regions
Health	Australia/State	Australia	Australia/State	State	Australia/State	State	Australia/State	State

Component	Grains		Dairy		Horticulture		Beef	
	Regions	Smallest area data reported by	Regions	Smallest area data reported by	Regions	Smallest area data reported by	Regions	Smallest area data reported by
Employment	GRDC Zones[1]	SLA	Dairy Regions	If SLA	Australia/State/SLA	SLA	Australia/State/SLA	SLA
Biophysical systems								
Soil	GRDC Zones/NHT-NAP regions	Grid, polygon	Dairy Regions	Surveys-industry + ABARE	1 State/SLA 2 Australia 3 NAP-NHT	1 ABS Survey 2, 3 Grids	Australia/States	1 ABS Survey
Biodiversity conservation	GRDC Zones	Grid	Dairy Regions	Grids	SLA NAP-NHT	Grids	1 ABS SD 2 States/ABARE Regions	1 ABS SD 2 ABARE Regions
Water - quality	GRDC Zone NAP-NHT	Catchments stream segments	Dairy Regions NAP-NHT	Catchments stream segments/Surveys industry + ABARE	SLA NAP-NHT	Catchments stream segments/Surveys industry	?	?
Water - quantity	Australia[3]/States	Australia[3]/States	Australia[3]/States	Industry monitoring	Australia/States	Australia/States	Australia/States	Australia/States
Greenhouse gas emissions	Australia/GRDC Zones	Grid AGO-area modelled	Australia	Cows- AGO modelling	Australia/SLA	Grid AGO-area-modelled	Australia	Cows-AGO modelling

Management practices selected for further investigation and development

Signposts Stage 2 investigated the expansion of the framework to incorporate a conceptual link between the achievement of ESD outcomes and business/natural resource management practices. The Signposts for Australian Agriculture Stage 2 report (Chesson, et al. 2005) will be used as a base for selecting management practices for the three industry profiles. The Grains Industry Profile included information on management practices. Table 3 shows the applicability of these practices to dairy, horticulture and beef. Sources of management practice information for Signposts Stage 3a are likely to be similar to those used in the Grains Industry Profile. Sources of management practice information for the grains industry included, for example, ABARE Resource Management Surveys, ABS Ag Stats, NLWRA *Australian Agriculture Assessment* (2001), and Research and Development Corporation information (GRDC, 2005). Additionally, Signposts Stage 3a will incorporate information from the *Nationally Coordinated Industry Survey of landmanagers* and Signposts *Business management practices* projects, where possible.

Table 3: Applicability of Grains Industry Profile land management practices to other agricultural industries

Management practice	Grains	Dairy	Horticulture	Beef
Control of feral animals or weeds	√	√	√	√
Controlled traffic systems	√	X	√	X
Deep rooted legumes	√	√	√	X
Dryland cropping using contour banks	√	X	?	X
Fertilising nitrogen	√	√	√	√
Fertilising phosphorous	√	√	√	√
Fertilising potassium	√	√	√	√
Liming	√	√	√	X
Maintain areas of conservation significance	√	√	√	√
Maintain cover along drainage lines	√	√	√	√
Minimum tillage and direct drilling	√	X	√	X
Monitor water quality	√	√	√	√
Regularly monitor water tables	√	√	√	√
Soil testing	√	√	√	X
Strip cropping	√	X	√	X
Vegetation establishment	√	√	√	√

Content information system

The electronic system developed by BRS for the grains industry will be tailored to present the three industry profiles and record stakeholder comments on the components. A standard 'look and feel' will be developed in consultation with the Audit.

The Grains Industry Profile used Plone as the electronic system. Plone is ideal as an intranet and extranet server, document publishing system, portal server and a collaboration tool. Another advantage of using Plone is that it is also a powerful and flexible Content Management System. As a document publishing system the current version of a document is simultaneously accessible to all stakeholders. Comments from multiple stakeholders are attached to this single version and management of feedback and incorporation into the document is streamlined. As a result using Plone allows document and data dispersal to be simplified and input and feedback are streamlined.

The Grains Industry Profile was developed with comments from the Audit. The graphical interface and portlets have been developed specifically to suit the needs of the Audit, allowing users quick and seemless transition to the Audit website and vice versa. Plone will allow Signposts Stage 3 to develop new Industry Profiles within the current system, ensuring consistent useability, look and feel.

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Appendix 1 Agricultural industry Research and Development Corporation- member groups

Dairy Australia

Dairy Australia delivers the services needed by the Australian dairy industry for its ongoing and future development as a competitive, innovative and sustainable dairy industry that contributes to the overall prosperity of Australian and regional economies (DA, 2005). The Australian dairy industry involves about 100,000 people through activities such as:

- farming (about 10,000 farms supporting or employing 50,000 people);
- services to farming (including veterinary, genetics, animal nutrition, milking machinery, seed and fertiliser, and fodder contracting – an estimated 10,000 people);
- manufacturing (including cheese, yogurt, ice-cream, butter, chocolate, powders, dairy and pharmaceutical ingredients – estimated at up to 30,000 people);
- transport (from on-farm milk pick-up to container shipping); and
- research (in areas such as agriculture, environment, human nutrition, manufacturing processes and food technology).

Dairy Australia membership is open to Australian dairy farmers and peak industry bodies.

References

Dairy Australia (2005). *About Us*, Dairy Australia. Website-

http://www.dairyaustralia.com.au/template_default.asp?Page=Content/About_Us/index.htm

Dairy Australia (2005b). *Our Industry*, Dairy Australia. Website-

http://www.dairyaustralia.com.au/template_default.asp?Page=Content/About_Us/Our_Industry/index.htm

Meat & Livestock Australia

Meat & Livestock Australia Limited (MLA) is a producer-owned company that provides services to livestock producers, processors, exporters, foodservice operators and retailers. MLA has around 34,000 livestock producer 'members' who have stakeholder entitlements in the company. Their mission is to develop world leadership for the Australian red meat and livestock industry. The core activities are building demand for Australian red meat, improving market access for our products and conducting research and development (R&D) to provide competitive advantages for the industry (MLA, 2006a).

All producers of grass or grainfed cattle, sheep or goats who pay livestock transaction levies are encouraged to register as a member of MLA. MLA membership is free to levy-paying producers of cattle, sheep, lambs or goats (MLA, 2006b).

For Signposts Stage 1 beef and sheep meat were found to be very different industries and as a result Signposts Stage 3 has separated out these species. Goats have not been included in the past, due to their small production levels (on advice from MLA), but this may change in the future.

References (Meat & Livestock Australia)

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MLA (2006b) *MLA membership*. Meat & Livestock Australia. Sydney. Website-http://www.mla.com.au/HeaderAndFooter/AboutMLA/MLA+membership.htm, Updated 2006, Accessed 2/5/2006.

Horticulture Australia Limited

HAL is a key strategic marketing and research partner to the Horticulture sector. Working with industry, HAL knows what's important to growers and makes it happen. Industry programs deliver time and cost savings and aid in the application of best practice. Through HAL, horticultural industries are able to access matching Australian Government funding for all R&D activities (HAL, 2004a). Membership of HAL is as follows (HAL, 2004b):

A class members

Apple and Pear Australia Ltd.

Almond Board of Australia

Avocados Australia Limited

Australian Citrus Growers Inc.

Australian Custard Apple Growers' Association

Australian Dried Fruits Association Inc.

Australian Lychee Growers Association

Australian Macadamia Society Ltd.

Australian Mango Industry Association Ltd.

Australian Mushroom Growers' Association Ltd

Australian Nashi Growers' Association Ltd.

Australian Onion Industry Association

Australian Papaya Industry Association Ltd.

Australian Passionfruit Industry Association Inc.

Australian Table Grape Association Inc.

Australian Vegetable and Potato Growers' Federation Inc.

Cherry Growers of Australia Inc.

Chestnut Growers of Australia Ltd.

Nursery and Garden Industry Australia

Persimmon Industry Association Inc.

Potato Processing Association of Australia

Strawberries Australia Inc.

Summerfruit Australia Ltd.

B class members

Australian Asparagus Council

Australian Banana Growers Council Inc.

Australian Garlic Industry Association Inc.

Australian Nut Industry Council Ltd.

Australian Processing Tomato Industry Council

Australian Rubus Growers Association Inc.

Australian Sugar Plum Industry Association

Australian Walnut Industry Association

Canned Fruits Industry Council of Australia

Growcom

Pistachio Growers Association of Australia Inc.

Tasmanian Pyrethrum Growers Commodity Group

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Appendix B: Using *Signposts* to report on industry's contribution to regional NRM targets

Signposts for Australian Agriculture

Issues Paper: Using *Signposts* to report on industry's contribution to regional NRM targets

Jean Chesson

August 2006

Summary

The *Signposts* framework explicitly addresses eight of the 10 matters for target in the National Framework for Natural Resource Management Standards and Target. The desired outcomes and proposed indicators for these components follow directly from the National NRM M&E Framework. The remaining two matters for target are less likely to apply to agricultural industries, but can be added if needed.

Signposts can be used to report on the contribution of agricultural industries to regional NRM targets. Three examples are provided from the grains industry profile: the contributions of the grains industry to soil acidity, the contributions of the grains industry to biodiversity conservation and the contributions of the grains industry to nitrogen in surface water.

Where the assets of an industry correspond to the assets of a region, *Signposts* can report directly on the achievement of NRM targets for those assets. Where an industry has an impact on regional assets that do not 'belong' to the industry (eg water quality), *Signposts* provides a measure of the contribution that the industry makes to that asset.

Signposts can accommodate regionally-specific targets and indicators. The *Signposts* framework can help identify data limitations but does not overcome the problem that some data are simply not being collected.

Synergies between industry-based frameworks such as *Signposts* and regionally-based frameworks such as the National Land & Water Resources Audit's Integrated Catchment Condition projects should be exploited wherever possible.

Introduction

The aim of the *Signposts for Australian Agriculture* project (*Signposts)* is to provide a consistent national framework for gathering and analysing agricultural and natural resource management information (*http://www.nlwra.gov.au/projects.asp?section=67*, Chesson and Whitworth 2005, Chesson et al 2005).

The National Framework for Natural Resource Management Standards and Targets and the National Natural Resource Management Monitoring and Evaluation Framework are important examples of how *Signposts* links directly with individual policies. The National Framework for Natural Resource Management Standards and Targets lists ten matters for which regional resource condition targets must be set:

1. Land salinity
2. Soil condition
3. Native vegetation communities' integrity
4. Inland aquatic ecosystems integrity (rivers and other wetlands)
5. Estuarine, coastal and marine habitats integrity
6. Nutrients in aquatic environments
7. Turbidity/suspended particulate matter in aquatic environments

8. Surface water salinity in freshwater aquatic environments
9. Significant native species and ecological communities
10. Ecologically significant invasive species

and three management action targets:

1. Critical assets identified and protected
2. Water allocation plans developed and implemented
3. Improved land and water management practices adopted

In addition, regions may establish targets for a variety of other matters.

This paper shows how the *Signposts* framework is designed to report on the contribution of agricultural industries to regional NRM targets and raises a number of issues that determine how effectively the reporting can be achieved.

Features of the *Signposts* framework

The *Signposts* framework has been designed to address the question:

> How does an agricultural industry contribute to ecologically sustainable development?

The contributions of an industry to ESD are first divided into three components: contributions to economic systems, contributions to social systems and contributions to bio-physical systems. Each of these is then divided into assets held by the industry (stocks) and contributions to assets held beyond the industry (flows) giving the 'component tree' shown in Figure 1. The components in the tree are then further sub-divided as required to cover all issues of interest relevant to the industry.

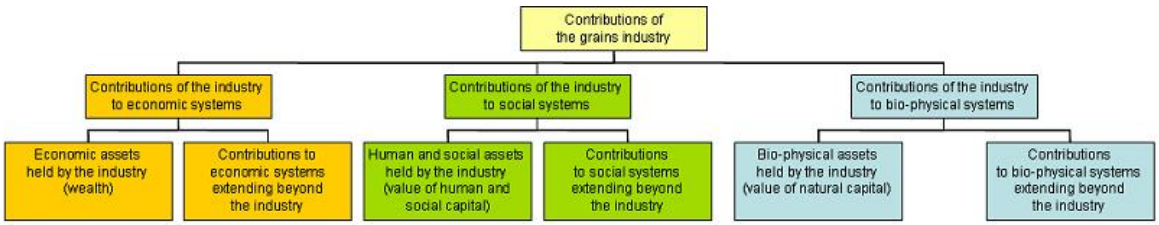

Figure 1: Major components of the Signposts framework.

Figure 2 shows a generic expansion of the bio-physical branch that is broadly applicable to all agricultural industries[2]. It explicitly addresses eight of the ten matters for target and their subcomponents (shown in bold in the main tree and its insets). The desired outcomes and proposed indicators for these components follow directly from the National NRM M&E Framework.

[2] The other branches of the *Signposts* tree address the National NRM M&E Framework requirement that 'monitoring will encompass measures of community and social processes relevant to or affected by NRM programmes'. This is not discussed further in this paper.

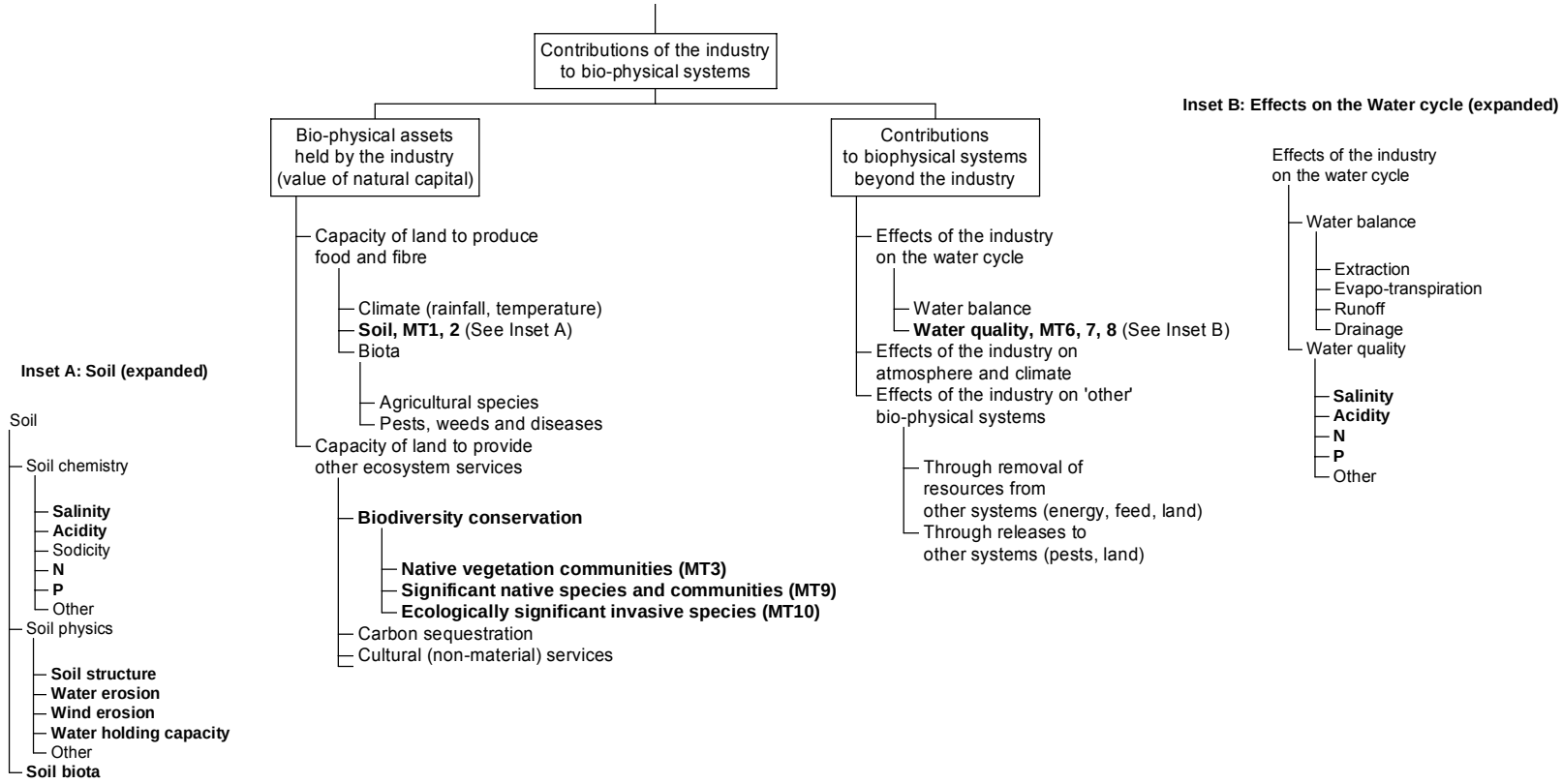

Figure 2: Bio-physical components of the Signposts framework and the matters for target that they address (in bold). The components are further elaborated as shown in the insets.

The two matters that are not listed explicitly in Figure 2 are 'inland aquatic ecosystems integrity' and 'estuarine, coastal and marine habitats integrity'. If an agricultural industry has one of these ecosystems (eg a wetland) within its own lands then the matter for target and its associated indicators would be added as a sub-component of 'biodiversity conservation services.' It is probably more common however, especially for estuarine, coastal and marine habitats, that the ecosystems of interest extend beyond the lands belonging to the industry and the contributions of the industry to regional targets for these ecosystems will be evaluated through the industry's contributions to components such as water quantity and quality rather than by the condition of the ecosystem itself.

The *Signposts* framework is defined by its components, not by indicators. This means that indicators can be selected and changed to suit the National NRM M&E Framework without affecting the framework. The *Signposts* framework is flexible. It is designed to evolve as needs dictate. It already includes components that are not currently matters for target, but could be in the future (Figure 2). Components to cover new matters for target can be added as needed.

Each component includes a 'response' heading under which management actions relevant to that component are listed and linked to detailed information, including desired outcomes (and potentially targets) and indicators for that management action. *Signposts* therefore can report directly on an agricultural industry's adoption of management practices as prioritised in a regional plan.

Three examples of how the *Signposts* framework can be used to report on industry's contribution to regional NRM targets are provided below. Each uses information from the Grains Industry Profile (www.brs.gov.au/signposts-grains). As profiles are developed for other industries, it will be possible to compare the relative contribution of different agricultural industries to particular regional targets.

Example 1: Soil acidity

Figure 3 shows how the grains industry contributes to the achievement of soil acidity targets in selected NAP regions. 'Soil condition' is a matter for target and soil acidity is a sub-component of soil condition for which an indicator has been recommended under the National NRM Monitoring and Evaluation Framework.

Each pie-chart shows the proportion of the region under grains cropping (total shaded area) coloured according to whether it is satisfactory for crop production (green, pH $\geq$ 5.5) or too acidic (red, pH < 5.5). From a regional perspective, the figure provides at a glance, two key pieces of information:

1. The extent of grains cropping as a land use within the region.
2. The degree to which there is an acidity problem associated with this land use.

Example 2: Biodiversity conservation

'Native vegetation communities' integrity' is a matter for target with 'extent and distribution' and 'condition' being the two indicator headings under the National NRM Monitoring and Evaluation Framework.

Figure 4 shows the proportion of each GRDC region that has native vegetation in moderate to good condition outside reserves using data from the Grains Industry Profile. This represents reasonable quality habitat that is managed by agricultural or other land managers. The information is presented by GRDC zone because within these zones the grains industry is the dominant land manager and the results provide a broad indication of the potential contribution of that industry to biodiversity conservation. The information could be presented by NAP or NHT region as required.

Example 3: Nitrogen input into surface water

'Nutrients in aquatic environments' is a matter for target and nitrogen in aquatic environments is an indicator heading under the National NRM Monitoring and Evaluation Framework. Figure 5 shows the contribution of GRDC regions to nitrogen in surface water in terms of a summary measure from the Grains Industry Profile. The summary measure is calculated from modelled data. A score of 1 is obtained when the contribution is no higher than that estimated for 'natural' pre-European conditions. A score of 0 is obtained when the contribution is more than 3.5 times 'natural.' The information is presented by GRDC zones because within these zones the grains industry is the dominant land manager and the results provide a broad indication of the contribution of that industry to nitrogen in surface water. The information could be presented by NAP or NHT region, but some additional analysis would be required because of the nature of the underlying modelled data.

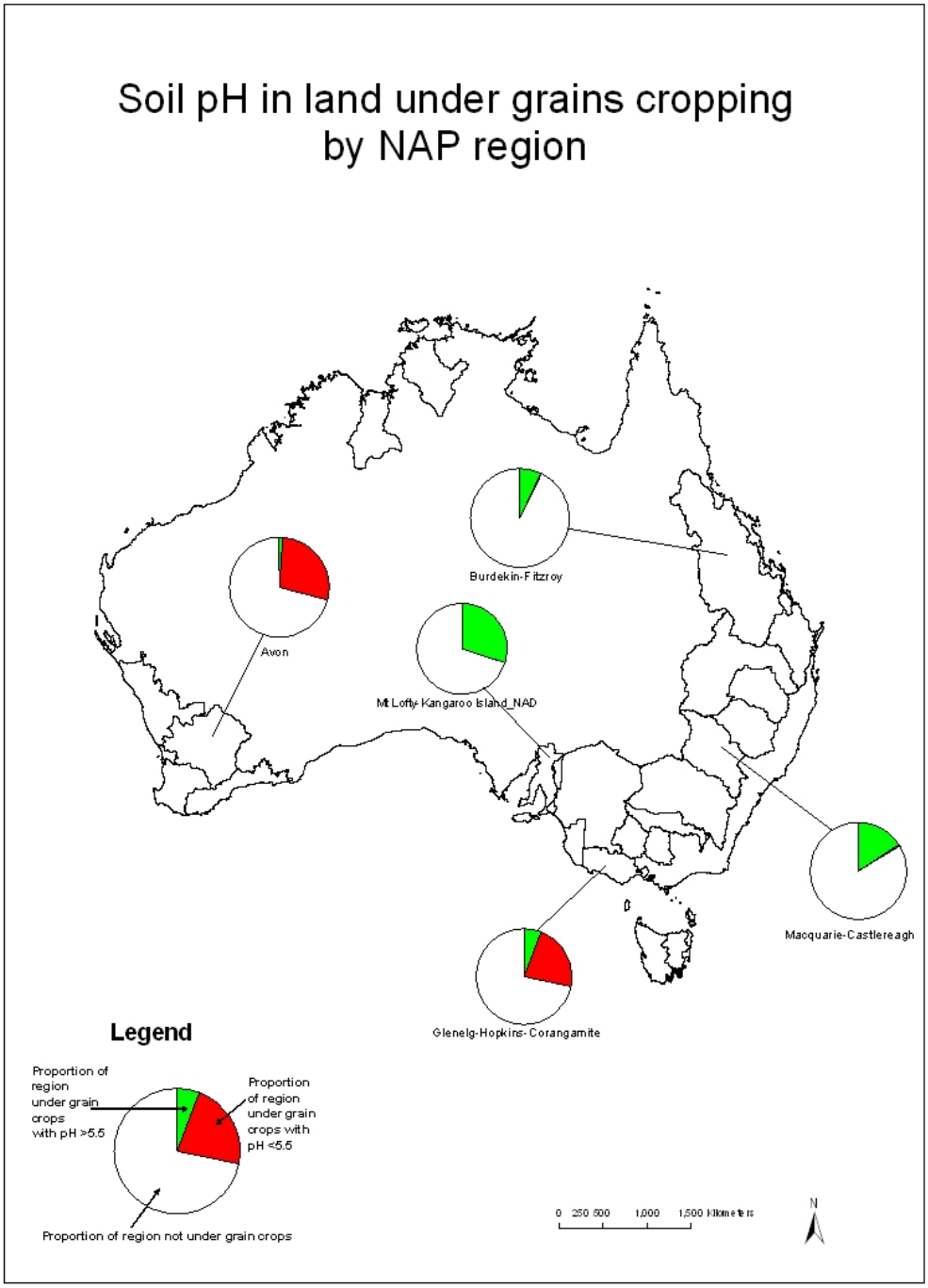

Figure 3: Proportion of selected NAP regions under grain crops (total shaded area) coloured according to whether soil is satisfactory for crop production (green, pH ≥ 5.5) or too acidic (red, pH < 5.5). Source: Grains Industry Profile (www.brs.gov.au\signposts-grains)

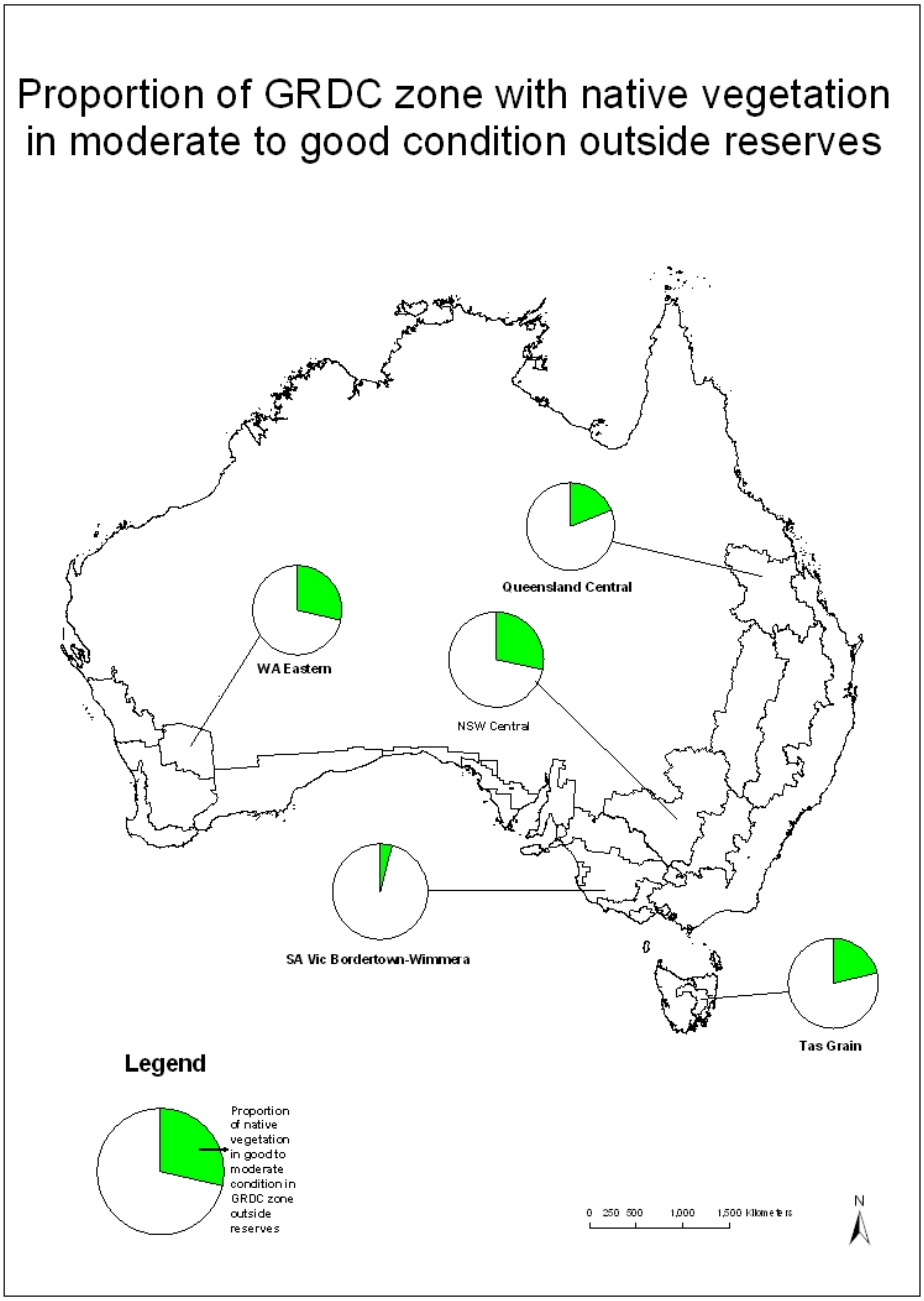

Figure 4: Proportion of GRDC zone with native vegetation in moderate to good condition outside reserves. Source: Grains Industry Profile (www.brs.gov.au\signposts-grains).

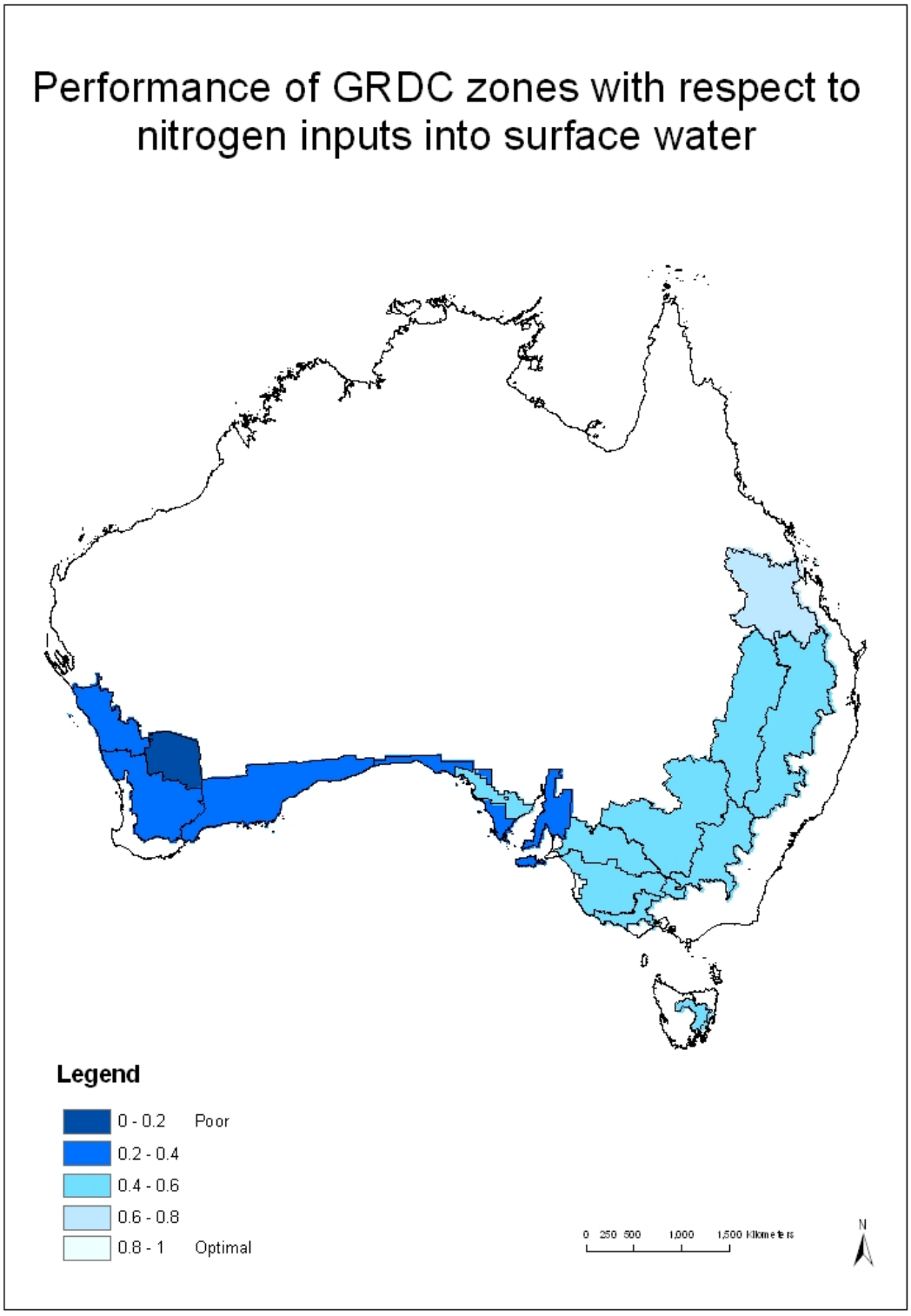

Figure 5: Performance of GRDC zones with respect to input of nitrogen into surface water. A score of 1 represents no additional input above 'natural.' Source: Grains Industry Profile (www.brs.gov.au\signposts-grains).

Issues

Choice of subject

The procedure used to develop the *Signposts* framework is very general and can be applied to practically any subject. The subject can be agriculture in general or any subdivision (extensive, irrigated, wheat/sheep) as required. For *Signposts* it was decided to focus on individual agricultural industries so that performance could be linked to an identifiable group of people. In a regional context it may be sufficient to group all industries and take 'agriculture' as the subject, at least for some components. This is especially the case if the relevant information is already expressed for agriculture as a whole. There is little point in going through the difficult process of attributing results to individual industries merely to aggregate it again. On the other hand, the region may need to consider individual agricultural industries in order to target management actions more effectively. For the purposes of the regional body, the choice of subject may be made on a component by component basis.

Assets versus contributions

There is an important distinction between components that fall under 'assets held by the industry' and 'contributions to bio-physical systems extending beyond the industry.' Where regional targets pertain to assets held by the industry (eg condition of soil on industry-managed land) the desired outcome, indicator and performance measure can be identical to that of the region. The industry data contributes to the regional data by filling in a part of the map for the region.

When regional targets pertain to systems extending beyond the industry (eg the condition of surface water entering a wetland several kilometres downstream) the relationship is less direct. *Signposts* will report on the industry's contribution (eg tonnes of sediment discharged to surface water from industry-managed land). Ideally, the region will establish a target for overall water quality and there will be some process for allocating discharge limits to each user. The limit might be zero in some cases. The industry will report its performance against its allocated discharge. The condition of water entering a wetland is likely to be measured directly rather than by combining information on discharges from individual users. If the regional water quality target is not being met, the region would examine the performance of each user against their allocated discharge limit to determine whether compliance needs to be improved or the allocated discharge limits need to be revised.

Features of the regions

Regions vary considerably in the extent to which they have set regional targets, the nature of those targets and the degree to which they have adopted the indicators of the National NRM M&E Framework. This limits the extent to which *Signposts* can actually report on industry's contribution to regional NRM targets. The electronic profiles for each industry have the potential to include specific regional targets where they exist. Both resource condition and management action targets can be incorporated. Similarly, regionally-

specific indicators and the values of those indicators can be incorporated if they are available.

Signposts can also report against *national* NRM targets on a regional basis using the indicators in the National NRM M&E Framework. These are the indicators used in the Grains Industry Profile wherever feasible.

Data

The *Signposts* framework is very flexible. Most of the serious limitations are imposed by data. Some data are simply not being collected. They may be available for one point in time with no plans for future collection. They may be available for some types of agriculture but not for others, or only in aggregate. They may be available in time but not in space. If they are available in space, the spatial resolution or spatial boundaries may be unsuitable for analysis at the regional scale. All of these issues will apply to some extent for each NRM target and in each region.

On the other hand, there is a great wealth of information that is being collected by the Australian Bureau of Statistics (ABS), the Australian Bureau of Agriculture and Resource Economics (ABARE) and others. The *Signposts* framework is being used to discover these under-utilised sources and identify where serious gaps occur so that priorities can be established for filling them.

Other uses of *Signposts*

Since *Signposts* includes social and economic contributions of the industry as well as bio-physical, it can contribute to balanced decision making when considering whether to intervene or invest in a regional issue.

The same procedure used to develop the *Signposts* framework can also be applied to the development of regional reporting frameworks. (See, for example, the integrated catchment condition projects of the National Land & Water Resources Audit, *http://www.nlwra.gov.au/projects.asp?section=55*.) Ideally, most of the components under 'bio-physical assets held by the industry' should be a subset of the bio-physical assets of the region with consistent targets (desired outcomes) and identical indicators. This can be achieved by modifying either framework to fit in with the other. The web-based tool being used to display results for agricultural industries under *Signposts* has been adapted for use as a regional reporting tool for regions that have not already developed a tool of their own.

Conclusions and Recommendations

Signposts can be used to report on the contribution of agricultural industries to regional NRM targets.

- Where the assets of an industry correspond to the assets of a region, *Signposts* can report directly on the achievement of NRM targets for those assets. For example, the Grains Industry Profile provides the proportion of cropped land in each NHT region that satisfies a soil acidity criterion. The region can obtain a complete picture by combining the spatial information from each land user.

- Where an industry has an impact on regional assets that do not 'belong' to the industry (eg water quality), *Signposts* provides a measure of the contribution that

the industry makes to that asset. For example, the Grains Industry Profile provides an estimate of the amount of nutrients and sediment contributed by the grains industry into surface waters.

– *Signposts* is very flexible and can accommodate regionally-specific targets and indicators. The *Signposts* framework can help identify data limitations but does not overcome the problem that some data are simply not being collected.

A regional reporting framework can be developed that uses a similar structure to *Signposts* and maximises the synergies between industry-based and regionally-based reporting. These synergies should be exploited wherever possible.

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Appendix C: Feasibility of extending the *Signposts* framework along the supply chain

Signposts for Australian Agriculture

Issues Paper: Feasibility of extending the Signposts framework along the supply chain

Jean Chesson

August 2006

Summary

The initial stages of the *Signposts for Australian Agriculture* (*Signposts*) project focussed on the primary production sector. This paper discusses the issues involved in extending the framework further along the supply chain.

There is no difficulty in generalising the *Signposts* framework to any sector within the supply chain. The main issues relate to how information is combined across sectors.

Three options are discussed:

1. Keep the agricultural industry as the subject but extend the scope to include its share of contributions from down chain sectors.

2. Extend the subject to a 'super industry' that includes several sectors.

3. Select a subject that is further along the supply chain such as the bread industry or the retail sector.

Option 1 is not feasible with current techniques and data. Option 2 may be applicable in limited situations. Option 3 appears to be the most feasible and is the approach adopted in *Signposts* Stage 5 (Chesson et al., 2006).

From both and theoretical and practical point of view, reporting along the supply chain is best achieved by the continued development of reporting by individual sectors combined with an overarching framework of core components that can be handled in a consistent manner across all sectors.

Introduction

The aim of the *Signposts* for Australian Agriculture project is to provide a national framework for consistent reporting on the contributions of Australia's agricultural industries to ecologically sustainable development (ESD).

Stages 1, 2 and 3 of the *Signposts* project developed a framework to address the question 'How does an agricultural industry contribute to ecologically sustainable development (ESD)?" (Chesson and Whitworth 2005, Chesson et al. 2005).

It was decided early in the project to focus attention on the primary production sector. An agricultural industry was defined as a group of people involved in primary production, ie activities carried out inside the farm gate. However, there has always been an interest in extending *Signposts* to encompass the 'supply chain', as it was recognised that some commodities provide their greatest contribution to ESD through value adding - post farm gate. This paper discusses the issues that this raises. It first describes where the current framework sits with respect to supply chain analysis and then discusses options for applying the framework further along the supply chain.

Current status

The conceptual framework for *Signposts* for Australian Agriculture was developed using the BRS Evaluation Procedure – a very general approach that can be applied to any subject

(Chesson 2004). For the *Signposts primary production framework* the chosen subject was an agricultural industry as defined above. This decision was made for practical and jurisdictional reasons. Identifying and measuring contributions to ESD for any subject is a complex undertaking. Therefore it is sensible to start with a narrow subject rather than a broad one. From a jurisdictional perspective, the Department of Agriculture and Fisheries & Forestry and the associated Research and Development Corporations have a major interest in the primary production sector, especially in terms of natural resource management. While interest continues along the supply chain, especially in terms of food processing, the interest becomes more diffuse as the transport, packaging, retailing, hospitality and service sectors are incorporated.

The terms 'up chain' and 'down chain' are used in this paper to avoid confusion with 'upstream' and 'downstream' as applied to water flow. Up chain refers to the sectors that supply the subject with goods and services. Down chain refers to the users of the subject's goods and services.

For the *Signposts primary production framework* the scope was specified as all social, economic and environmental contributions, positive and negative, short and long term. Many of these contributions will be to systems far beyond the farm gate. The only explicit restriction was the exclusion of contributions beyond Australia for practical rather than conceptual reasons. The primary production framework also includes the identification and documentation of attempts to influence those contributions such as the adoption of specific management actions.

Contributions from up chain suppliers such as tractor manufacturers or seed growers are within scope, but are generally regarded as minor relative to the activities of the primary industry itself and so far have received relatively little attention. Contributions by down chain sectors are considered out of scope. For example, the consumption of energy by the baking industry is not attributed either fully or in part to the grains industry. Similarly, employment by the baking industry is not attributed either fully or in part to the grains industry.

In the *Signposts* primary production framework, contributions to biophysical systems beyond the industry are measured as they leave the industry rather than in terms of their subsequent impact. For example, impacts on aquatic systems are measured in terms of discharges to water rather than impacts on an off-site wetland. There are practical as well as conceptual reasons for this. An offsite wetland is not under the control of an industry and no single industry can be held responsible for its condition. Ideally, a catchment management authority or similar body will determine water quality and other requirements for a wetland and then establish a process by which these requirements are translated into limits for individual land users. The responsibility of the industry is to operate within these limits, not to maintain the offsite wetland.

In summary, the scope of the *Signposts* primary production framework is consistent with that of Foran et al. (2005) which accounts for impacts of the full upstream supply chain and regards downstream impacts as out of scope. Since an agricultural industry has relatively few up chain suppliers, analysis has focussed on direct contributions. Nevertheless, up chain contributions such as impacts of bringing in feed and fertiliser are explicitly listed.

Boundary issues

Irrespective of the chosen subject, any analysis of its contributions to ESD raises the question of where and how to draw boundaries. (Foran et al., 2005) (Suh et al., 2004).

Figure 1 depicts a simplified supply chain centred on the grains industry as the subject. A complete analysis would include an appropriate share of the contributions of all of the grains industry's up chain suppliers and an appropriate share of the contributions of all the down chain sectors supplied by industry as well as the direct contributions of the grains industry itself. As modern economies are highly interconnected, there are very few sectors that are not connected in some way to almost every other sector. Note that the two boxes labelled 'wholesale trade' in Figure 1are actually the same sector and that the relationships form a web rather than a chain. The scope of the analysis could, in theory, span the global economy. In practice, the scope has to be more limited.

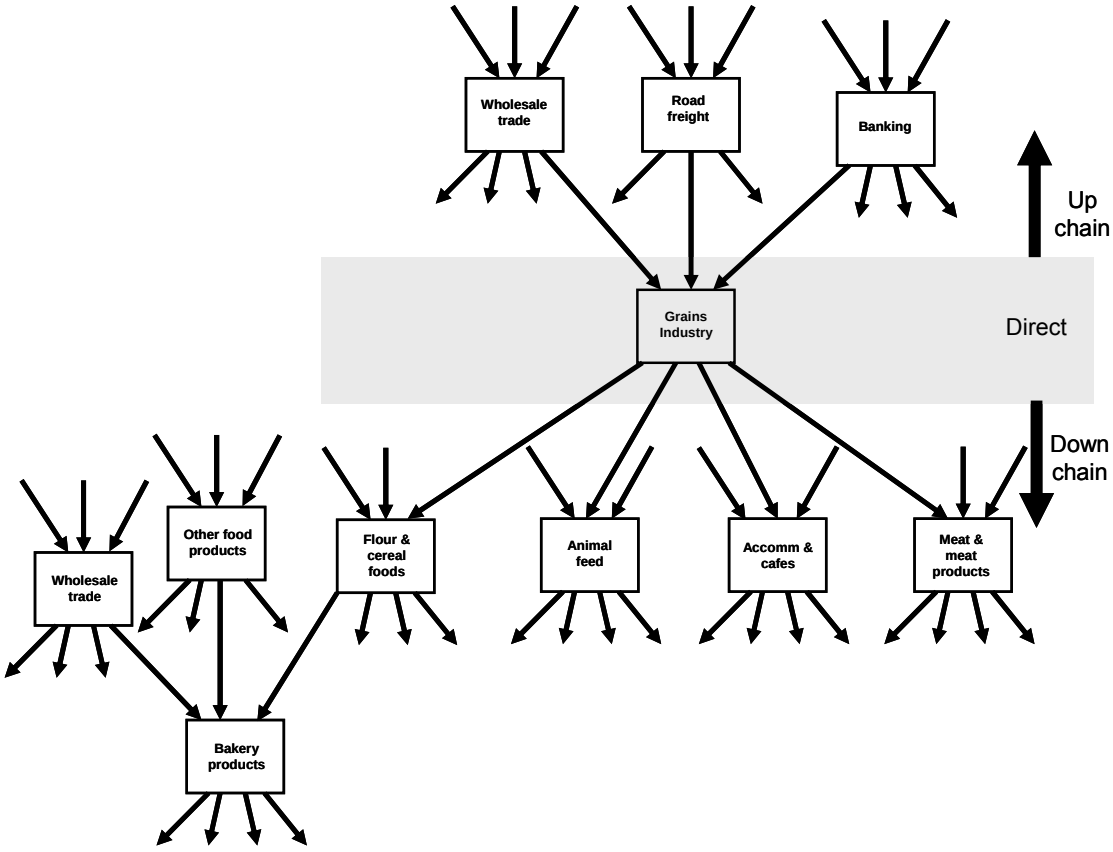

Figure 1. A simplified, stylised example of a supply chain with 'up chain' suppliers to the grains industry and 'down chain' users of grains industry products.

The direct contributions of the grains industry shown in Figure 1 are not restricted to on-farm impacts. They include all economic, social and environmental contributions generated by the grains industry irrespective of where the impact occurs. For example, the direct contributions include contributions to rural communities through employment and social capital and contributions to bio-physical systems through emissions into air and water that may extend far beyond the farm gate. Additional contributions to rural communities provided through the existence of a flour mill or a flour mill's emissions to air or water are classified as down chain contributions.

Even in the simplified supply chain shown in Figure 1, it is apparent that there needs to be some way of bounding the analysis. When dealing with the full range of economic, social and environmental contributions it can be difficult to impose consistent boundaries. For example, an up chain supplier may have an insignificant role in terms of contributing economic value or employment but represents a significant environmental contribution. If boundaries were imposed based on economic value, environmental contributions could be seriously underestimated.

Foran et al. (2005) applied generalised input-output analysis to 135 sectors of the Australian economy to achieve a complete up chain assessment that does not impose any boundaries. The generalised input-output analysis relies on the Australian Input Output Tables compiled by the Australian Bureau of Statistics combined with various national social and physical accounts. Since information is needed for each one of the 135 sectors, the analysis is restricted to ten "macro" indicators. The analysis provides broad comparisons across sectors rather than detailed information within a sector. Down chain impacts were beyond the scope of the project but the authors claim that it will be feasible to include them using analytical methods that are currently under development. A major limitation is the lack of appropriate data (B. Foran, personal communication July 2005).

A typical assessment concentrates on the direct contributions of the subject using a greater number of micro indicators than possible with an input-output approach. One or two levels of up chain suppliers may be included. Foran et al. 2005 refer to this as an 'audit' approach. The Global Reporting Initiative is an example (http://www.globalreporting.org).

A hybrid approach attempts to obtain the best of both approaches by placing a more detailed audit within the context of an overall input-output analysis applied to a limited number of macro indicators.

Implications of moving along the supply chain

The *Signposts* primary production framework takes an agricultural industry as the subject and regards all up chain suppliers as in scope. There are a number of ways in which an analysis can be extended along the supply chain. The following three options are discussed below:

Option 1. Keep the agricultural industry as the subject but extend the scope to include its share of contributions from down chain sectors.

Option 2. Extend the subject to a 'super industry' that includes several sectors.

Option 3. Select a subject that is further along the supply chain such as the bread industry or the retail sector.

1. Include a share of contributions by down chain sectors

As indicated above, there has been progress on the theory of down chain analyses but data availability will be a major limitation to any comprehensive analysis comparable to the upstream analysis of Foran et al. (2005). For example, to attribute a portion of the retail sector's greenhouse gas emissions to the grains industry, one would need to quantify the grains industry's share of the retail sector through all products incorporating grain. As the relationship between the subject (the grains industry) and its down chain contributions

through other sectors becomes more and more diffuse, the likelihood of having appropriate data diminishes.

2. Define a 'super industry' as the subject

Where several sectors are closely linked it may be practical to define a single 'super industry.' For example, the 'grain growing and manufacture of flour and cereal foods' could be treated as a single sector. Contributions would be expressed as the total across the combined sectors. This approach is less useful for more diffuse relationships. For example, combining the grains industry with the accommodation and cafes sector would not be particularly helpful.

3. Select a subject further along the supply chain

This approach has been taken in *Signposts* Stage 5 where case studies have considered the bread sector, a sub sector of bakery products, and the confectionery sector. Contributions of the bread sector include the appropriate share of the contributions of all up chain suppliers including the grains industry and the flour milling sector. This is no different from the approach taken with the *Signposts* primary production framework, but up chain suppliers play a more significant role. For example, some of the major contributions to bio-physical systems are from up chain primary sectors such as grains and dairy rather than direct contributions by the bread or confectionery sectors themselves. Boundary issues become a more serious problem for subjects further along the supply chain.

The *Signposts* Stage 5 project suggests a novel approach to overcoming the problem of boundaries. If each sector caries out its own direct analysis, combines this information with corresponding information requested from its suppliers and passes the results to its customers, a boundary-free result is generated automatically.

Discussion

It is important to clearly define the subject of any analysis. The BRS ESD Evaluation Procedure can be applied to any subject irrespective of its position in a supply chain. This has been demonstrated in *Signposts* Stage 5 with a generic framework for environmental components that can be applied to all sectors. There should be no special difficulty with the economic and social components as they are already quite generic.

Once the subject has been defined, the scope of the analysis has to be determined. A complete analysis would take into account the contributions of all up chain suppliers and all down chain users in addition to the direct contributions of the subject itself.

For subjects near the 'top' of a chain, the relative importance of up chain suppliers is generally small relative to direct subject effects. This assumption can be tested with a complete up chain analysis such as the generalised input-output analysis of Foran et al. For subjects further along the supply chain the contributions of up chain suppliers can be a major determinant of the subject's total contributions. For example, the major environmental contributions of the food manufacturing sectors are typically contributed by their up chain suppliers, the primary producers.

A complete and consistent down chain analysis is difficult especially for subjects near the top of a chain with very diffuse downstream linkages. The theory is still in a developmental stage and data are likely to be limiting.

To extend analysis along the supply chain the most feasible option appears to be to define a subject further along the chain and to carry out a mix of audit approaches and up chain analysis – a hybrid approach. This approach also makes sense from an adaptive management point of view as sectors are usually in a better position to influence the behaviour of their up chain suppliers compared to their down chain users.

Another advantage of an up chain analysis is that the results for subjects higher in the chain can be used in the analysis of a subject further along the chain. For example, in Figure 1, the results for the grains industry become one of the inputs to an analysis of the animal feed industry. This feature has been used to advantage in *Signposts* Stage 5 with the suggestion that if each sector in the chain does its bit, a complete boundary-free result can be achieved.

In life cycle analysis the subject can be thought of as the disposed product. The life cycle analysis then becomes the complete up chain analysis of that product (cradle to grave).

This paper identifies three ways in which the existing *Signposts* framework could be extended to a 'supply chain analysis.' Based on the discussion above, Option 1 is not feasible with current techniques and data. Option 2 may be applicable in limited situations. Option 3 appears to be the most feasible and is the approach adopted in *Signposts* Stage 5.

The implications of adopting Option 3 are as follows:

– The subject of the analysis is a set of goods or services. The more general the subject (eg all products containing grain) or the further along the supply chain (eg hospitality services), the greater the number of up chain sectors involved and hence the greater the data requirements. It seems unlikely that analysis of very general subjects will be feasible in the short term. However, if the recommendations of Signposts Stage 5 are adopted and consistent reporting across all sectors of the food value chain is achieved, analysis of very general subjects will be feasible in the longer term with the burden of data collection and reporting shared along the chain.

– It is important to continue to develop reporting processes for individual sectors (primary production, food manufacture, etc) as these will form the input to analyses extending along the supply chain.

– Reporting by individual sectors needs to include components that are common to all sectors to allow integration along the chain. Signposts Stage 5 shows how the environmental components of the Signposts framework developed for the primary production sector can be generalised to achieve this.

From both a theoretical and practical point of view, reporting along the supply chain is best achieved by the continued development of reporting by individual sectors combined with an overarching framework of core components that can be handled in a consistent manner across all sectors.

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Appendix D: Stocks and flows

The differentiation between stocks (condition of assets held by the industry) and flows (impacts of the industry on assets held by others) appeared in *Signposts* Stage 1 for bio-physical components. In Stage 2 it was extended to the economic and social components. It is the key to linking frameworks such as *Signposts* that are interested in both the condition of resources and the costs and benefits associated with their use with frameworks such as the National NRM Monitoring and Evaluation Framework and State of Environment reporting which focus on resource condition. *Signposts* extends the 'state' component of the 'pressure-state-response' way of looking at the world to include both stocks and flows. In doing this, it links two approaches that have previously been regarded as incompatible – the pressure, state, response framework (ref) and the capital stocks.approach favoured by ecological economists (eg Arrow, etc).

The decision of whether or not to assign an asset to the industry requires judgement and involves a trade-off between judging industry performance against what is within the industry's capacity to influence and the need to link industry performance with an overall outcome. For example, the community is more interested in knowing how the condition of agricultural land is changing rather than whether or not an industry has done its best under the circumstances. The ideal situation is achieved when one and only one player is held ultimately accountable for the condition of an asset and all other players are held responsible for their impact on that asset. If the industry shares an asset with others (eg the atmosphere) or an asset is 'held' by another identifiable player (eg land in national parks) then the industry is not accountable for the condition of the asset and the industry's effects on that asset fall under the 'flows' branch of the component tree.

Within economic systems, 'wealth' is regarded as an asset held by the industry. Wealth refers to the financial capital held by the industry. Although wealth may increase or decrease through factors external to the industry such as interest rates and changing land values, it cannot be sensibly attributed to any other player. In theory, adding up the value of the wealth component across all entities should give a total for Australia as a whole.

Within social systems, certain aspects of human and social capital are regarded as assets held by the industry. These include aspects of human capital that allow individuals to carry out industry roles (eg education and skills relevant to the industry) and social capital associated with industry-specific institutions. Although the value of these aspects of human and social capital may increase or decrease through factors external to the industry such as the state of the labour market, it cannot be sensibly attributed to any other player. In theory, combining information across all players should give a picture of these aspects of human and social capital for Australia as a whole. An advantage of identifying human and social assets held by the industry is that these components can incorporate the results of Nelson et al (2006).

The attribution of human and social assets to an industry is tricky because it is more subtle than simply assigning individuals to industries. The attribution recognises that within in single individual there are some aspects of human capital that 'belong' to the industry and other aspects that 'belong' to the broader community. Thus an individual may simultaneously 'contain' some industry assets (stocks) and be the conduit of industry impacts that flow beyond the industry into the broader community.

Within bio-physical systems, land owned or managed by the industry is regarded as an asset held by the industry. Although the value of natural capital associated with the land may increase or decrease through factors external to the industry such as climate variability, it cannot be sensibly attributed to any other player. In theory, looking at the natural capital associated with each patch of land should give a picture for the whole of Australia.

After considerable discussion, it was decided that water should not be regarded as an asset held by the industry. While there are aspects of water such as local rainfall and groundwater contained within industry land that could be considered as industry assets, there are others aspects such as reduction of flows into rivers and streams, impacts on water quality and extraction of water from offsite sources that are more readily considered impacts on the assets of others. In this sense, water sits between land at one extreme and atmosphere at the other. Rather than handle water as a mix of stocks and flows, it was decided to regard the water cycle as a system extending beyond the industry, ie similar to atmosphere and consider all industry contributions to the water cycle (impacts on water quantity and water quality) as flows.

Appendix E: Response to reviews of the components of the *Signposts* Framework

Introduction

The generic Stage 2 component tree is shown in Figure E1. Each industry profile uses a version of the generic component tree tailored to its needs. Some branches may be simplified. For example, the Grains Industry Profile currently includes a single component for biodiversity conservation without any further subdivision. Other branches may be elaborated. If an elaboration seems likely to have more general application it will be incorporated into the next version of the generic component tree. At the same time, the generic tree itself is subject to repeated review and revision as thinking develops and more effective ways of characterising agriculture's contributions to ESD are discovered.

To avoid confusion regarding the content of the *Signposts* framework at any particular point in time, it was agreed that the generic framework should be documented with date and version number. The component tree in Figure E1 is designated Signposts Generic Component Tree Version 2. Stage 3 of the *Signposts* project will produce a revised generic component tree reflecting, among other things, reviews of the social components by ANU and ABS. The component tree in Figure E2 is designated Signposts Generic Component Tree Version 3.1. Reasons for the differences between Version 2 and Version 3.1 are documented below.

Responses to the ANU review

BRS commissioned Jacki Schirmer, School of Resources, Environment and Society, Australian National University, to review the social components of version 2 of the *Signposts* framework (Figure E1). The review provided a comprehensive discussion of social indicator frameworks, the current structure of the social components of *Signposts* and recommendations for further development (Schirmer 2006). The main recommendations are as follows:

- Include both mental and physical health under 'health'
- Rename 'education' as 'education and skills' to emphasise the importance of informal learning as well as formal educational qualifications
- Replace 'industry institutions and organisations' with 'social networks and relationships' to emphasise the importance of informal as well a formal networks.
- Add 'households dependent on the industry' as a recipient of the industry's contributions to give four categories of recipients: individuals employed in the industry, households dependent on the industry, local and regional communities and national community.

The review proposed seven standard components to characterise an industry's contributions to each category of recipients:

- Health
- Education and skills
- Economic well-being
- Employment conditions
- Living conditions
- Social capital
- Culture and identity

The review proposed that all seven be applied to 'individuals employed in the industry' and then discussed which should be applied to each of the remaining categories of recipients.

The recommendations were adopted in principle and have been incorporated into Version 3.1 of the generic component tree with some modification as a result of the ABS review.

Responses to the ABS review

The National Land and Water Resources Audit commissioned ABS to review the economic, social and environmental components of the Signposts framework and provide recommendations on alternative outcomes statements, associated indicators and natural resource management practices that could be considered for inclusion in future key industry profiles of the grains, dairy, beef and horticulture industries.

The ABS review provided 13 recommendations (Williamson 2006). The response to each recommendation is listed in Table E1.

Table E 1. Responses to ABS recommendations

ABS Recommendation	Response
1. It is recommended that the inclusion of 'stocks' as part of the structure of the *Signposts* framework be reviewed.	The inclusion of stocks has been reviewed. It is important that they remain as part of the framework in order to link resource condition frameworks such as the National NRM M&E Framework with industry performance. Words to this effect have been included in the Stage 3a report. Language has been added to acknowledge that in any given time period, the contributions of an industry are represented by the change in the value of a stock.
2. It is recommended that the implications of using different methods for measuring contributions to ESD be carefully considered. Especially on the ability to aggregate and compare results across components and industries.	We agree that the implications of using different methods should be carefully considered. This is done on a case by case basis for each component and depends on the nature of the desired outcome. Language has been included in the Stage 3a report stating that *Signposts* has multiple uses (eg, documenting industry performance over time versus comparing industries with one another) and the desired use influences the nature of the measurement process. A long term goal would be to allow a user to

	select the type of measurement process appropriate to their need.
3. It is recommended that the implications of the potential for double counting of contributions on the ability to aggregate and compare results across components and industries be carefully considered.	We agree with the recommendation. It is a particularly difficult issue with the social components. The current approach attempts to assign a particular contribution to one and only one scale. For example, employment is considered only at the regional scale and public health only at the national scale. Some of the proposals put forward in the ANU report and this report suggest considering the same contribution at more than one scale and we will have to avoid double counting. The suggested changes to label names in Section 3 below are a useful suggestion, but may cause some practical difficulties.
4. Consider including 'Level of employment satisfaction' as a component in the 'individuals' component of 'Contributions of the industry to social systems - human and social assets'. Suggested desired outcomes, indicators and interpretation are also included below.	Agree that this should be considered as part of revision of social components with high likelihood of inclusion. Not sure of the value of 'attendance at field days' as an indicator of job satisfaction.
5. Consider including 'Level of education and skills' as a component in the 'households' component of 'Contributions of the industry to social systems - extending beyond the industry'. Suggested desired outcomes, indicators and interpretation are also included below.	Agree that this is worthy of consideration, but need further clarification of the industry's expected role. Does/should the industry have a goal of improving the education and skills of household members? Alternatively, is there concern that household members are disadvantaged with respect to educational opportunities as a result of being associated with the industry? It would be interesting to explore some data on this topic before deciding whether to include it. The ANU report did not regard this component as significant.
6. Consider including 'Employment opportunities' as a component in the 'households' component of 'Contributions of the industry to social systems - extending beyond the industry. Suggested desired outcomes, indicators and interpretation are also included below	Comments similar to those for Recommendation 5, but possibly greater likelihood of inclusion. Could consider Recommendations 5 and 6 together and create a component representing the impact of the industry requiring households to live in particular locations. Responses would presumably include industry and government initiatives to reduce locational disadvantage.
7. Consider including 'Health' as a component in the 'local and regional communities component of 'Contributions of the industry to social systems - extending beyond the industry. Suggested desired outcomes, indicators and interpretation are also included below.	Seems to be two separate issues here: 1. The impacts of the industry on health of local and regional communities, ie disease, illness through exposure to chemicals, dust etc 2. The impacts on health due to living in a particular location that might, for example, have poorer health services. The first contribution should be included considered for inclusion. Industry specific data may be difficult to find and implying cause and effect without good evidence would be dangerous. The second is not a contribution of the industry unless one argues that the community is only there because the

	industry required it to be there and is imposing inferior health services upon it. Suggest that this issue is more readily incorporated into the 'locational disadvantage' component under households.
8. Consider including 'Quality of life' as a component in the national community component of 'Contributions of the industry to social systems - extending beyond the industry. Suggested desired outcomes, indicators and interpretation are also included below.	Response: Agree that this component should be added. We need to come up with a more precise descriptor as everything in the component tree is intended to be part of quality of life. Should this be something like 'contribution to general revenue'?
9. Consider including 'Water balance' as a component of 'Contributions of the industry to bio-physical assets held by the industry/on the capacity of the land to produce food and fibre' as shown below. Suggested desired outcomes, indicators and interpretation are also included below.	We agree that a component 'water resource' should be added to the bio-physical assets held by the industry. This would be in addition to and separate from the water cycle components. At present, this concept is partially included as the 'rainfall' subcomponent under climate. It should be extended to include water held in farm dams. There is also the possibility of including water entitlements and water-related infrastructure. This opens up the issue of physical infrastructure which has not yet been explicitly included in the *Signposts* framework. The 'water resource' component should not include salinity-related issues as these are dealt with under the 'salinity' sub-component of soil.
10. Consider including the following desired outcomes, indicators and interpretation for the 'Water balance' component of 'Contributions of the industry to bio-physical systems extending beyond the industry/effects of the industry on the water cycle' as shown below.	See earlier comments and response to Recommendation 9.
11. Consider including a number of additional components in the 'Biodiversity conservation' component of 'Capacity of land to provide other ecosystem services'. These have been drawn from the National objective and targets for Biodiversity Conservation 2001-2005. Suggested desired outcomes, indicators and interpretation are also included below. Consider including a number of additional components in the 'Biodiversity conservation' component of 'Capacity of land to provide other ecosystem services'. These have been drawn from the National objective and targets for Biodiversity Conservation 2001-2005. Suggested desired outcomes, indicators and interpretation are also included below. Consider including a number of additional components in the 'Biodiversity conservation' component of 'Capacity of land to provide other ecosystem services'. These have been drawn from the National objective and targets for Biodiversity Conservation 2001-2005. Suggested desired outcomes, indicators and interpretation are also included below.	The recommendation to explicitly address the national objectives and targets is appropriate. Most of these are already included through the National NRM Matters for Target but this is not immediately apparent from the Grains Industry Profile which has a simplified bio-diversity conservation component. The Stage 3a report will include a full generic component tree so that the *Signposts* structure at any given time can be identified. A cross reference to the National objectives and targets for biodiversity conservation will be included.
12. Consider including 'Impacts of climate change on biodiversity' as a component of 'Effects of the industry on 'other' bio-physical systems'. These have been drawn from the National objective and targets for Biodiversity Conservation 2001-2005. Suggested desired outcomes, indicators and interpretation are also included below.	The *Signposts* framework attempts to document industry contributions as close to their origin as possible. For example, the framework includes emissions into air and water rather than the impact of those emissions on biodiversity conservation or other outcomes. The suggested desired outcome and indicators are incorporated within the 'effects on atmosphere and

	climate.' We would welcome data on green-house gas emissions and on management practices.
13. Consider including 'Health of Australia's water resources and water dependent ecosystems' as a component of 'Effects of the industry on 'other' bio-physical systems'. These have been drawn from the National objective and targets for Biodiversity Conservation 2001-2005. Suggested desired outcomes, indicators and interpretation are also included below.	The intention is to include effects on the health of Australia's water resources under effects of the industry on the water cycle which includes both water quantity and water quality as sub-components. Where water dependent ecosystems reside within land managed by the industry, the health of those ecosystems should be included as a sub-component of 'biodiversity conservation'. Where water dependent ecosystems reside outside land managed by the industry, the contribution of the industry is captured through the industry's effect on water quality and quantity rather than the health of the ecosystem.

Revised component tree

Combining recommendations from the ANU review and the ABS review, Version 3.1 of the generic component tree has four categories within 'human systems extending beyond the industry':

- national community (all households)
- households in the same region as the industry
- households dependent on the industry
- individuals employed in the industry (full time, part time, paid and unpaid).

Each category is nested within the category above it.

The seven standard categories from the ANU review have been applied to each of the four categories taking into account the ABS recommendation of the need to avoid double counting. Double counting has been minimised by either having a component appear only once or by having different, non-overlapping aspects of a component appear in each category. For example, employment in the sense of providing an occupation for people, appears only under 'national community' where all employment provided by the industry is accounted for. Health appears in three of the four categories, but refers to different aspects of health. At the national community level it refers to the health effects of products (nutrition, chemical residues, disease, etc.). At the dependent household level it refers to the health costs and benefits for non-employees and at the individual employee level it refers to the health costs and benefits for employees.

The Social and Economic National Coordination Committee (SENCC) has recently recommended a set of indicators and protocols relating to the capacity of land managers to adopt management practices and social and institutional foundations of natural resource management. The sub-components of the human assets branch of the *Signposts* component tree have been modified to align as closely as possible to the SENCC terminology noting that in *Signposts*, human assets include human and social capital needed for all aspects of

industry business not only those that fall within a definition of natural resource management.

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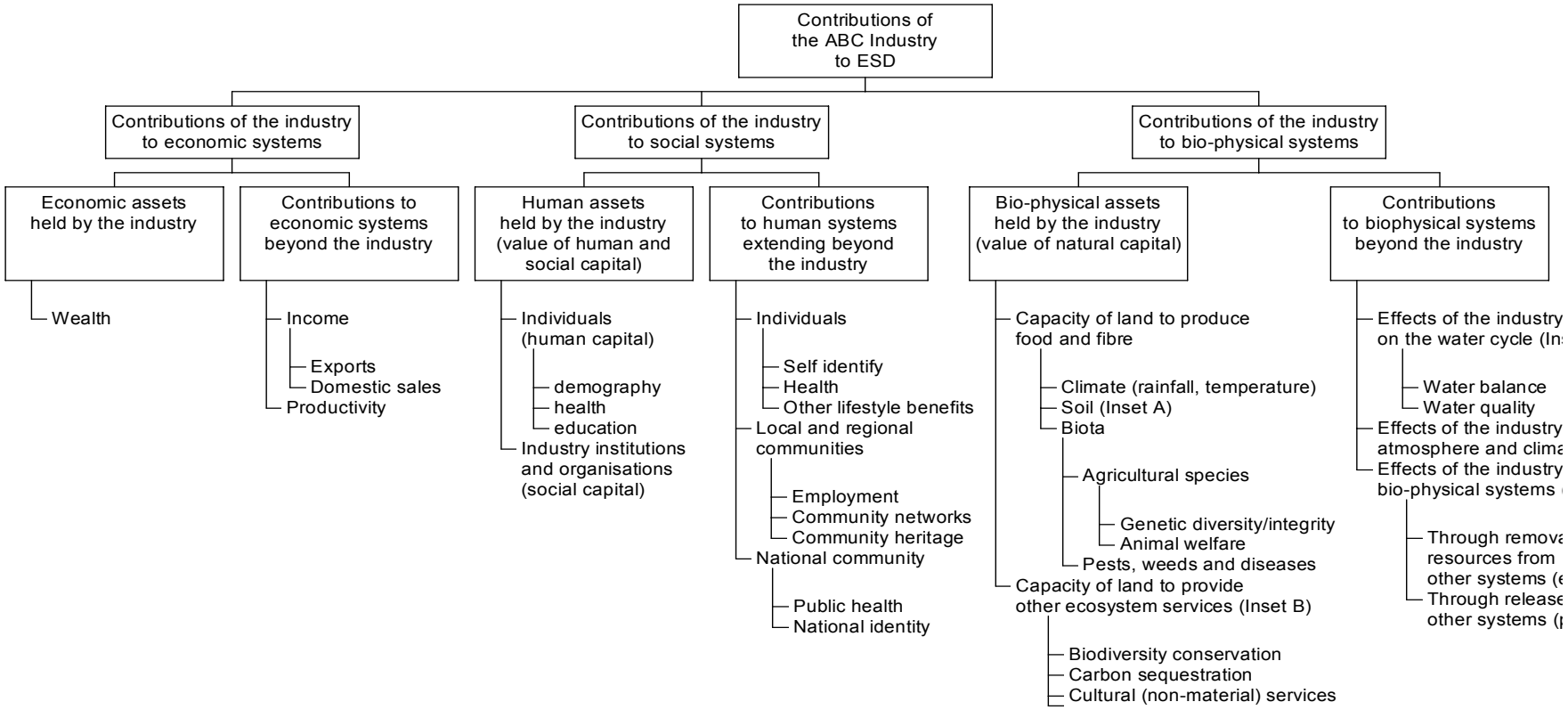


Figure E1. Signposts for Australian Agriculture Generic Component Tree Version 2.

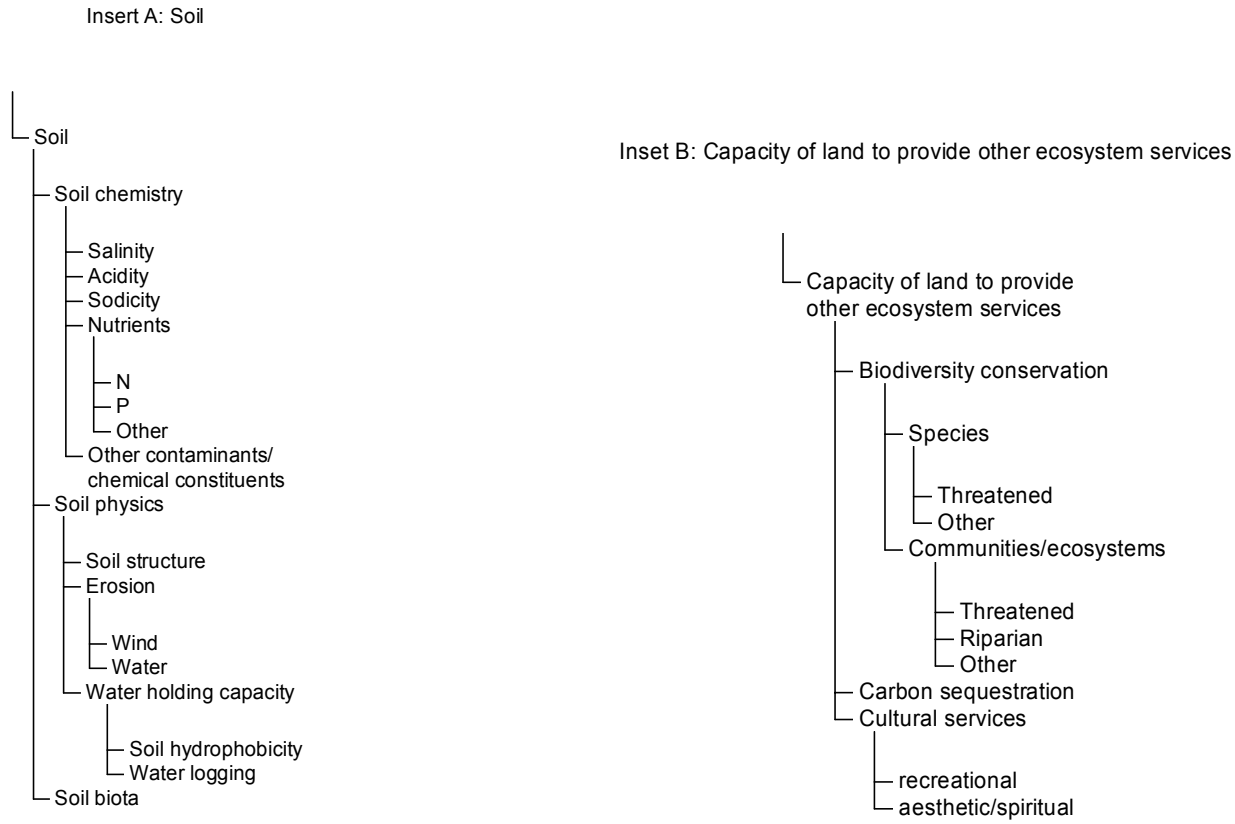


Figure E1. Signposts for Australian Agriculture Generic Component Tree Version 2 (ctd).

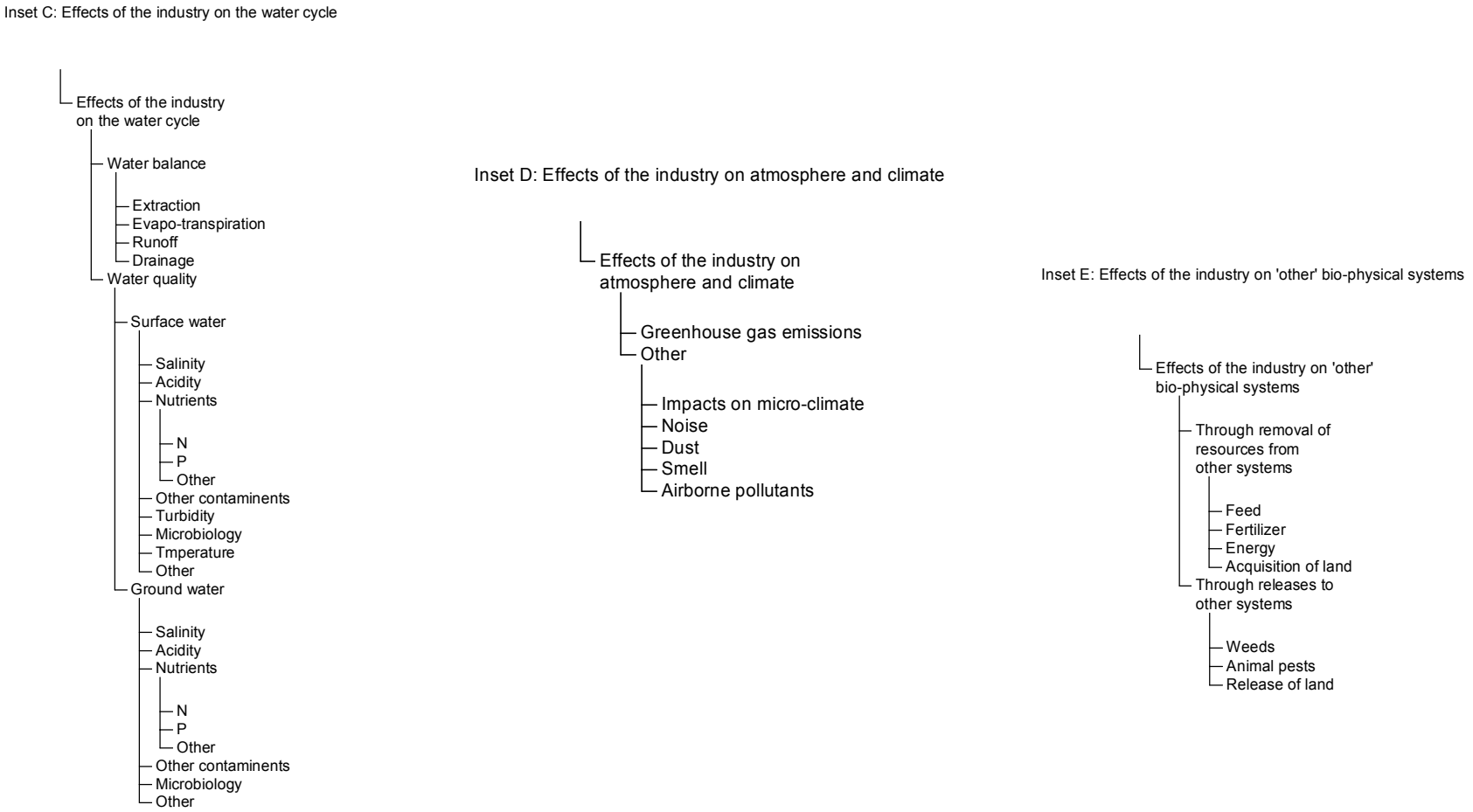


Figure E1. Signposts for Australian Agriculture Generic Component Tree Version 2 (ctd).

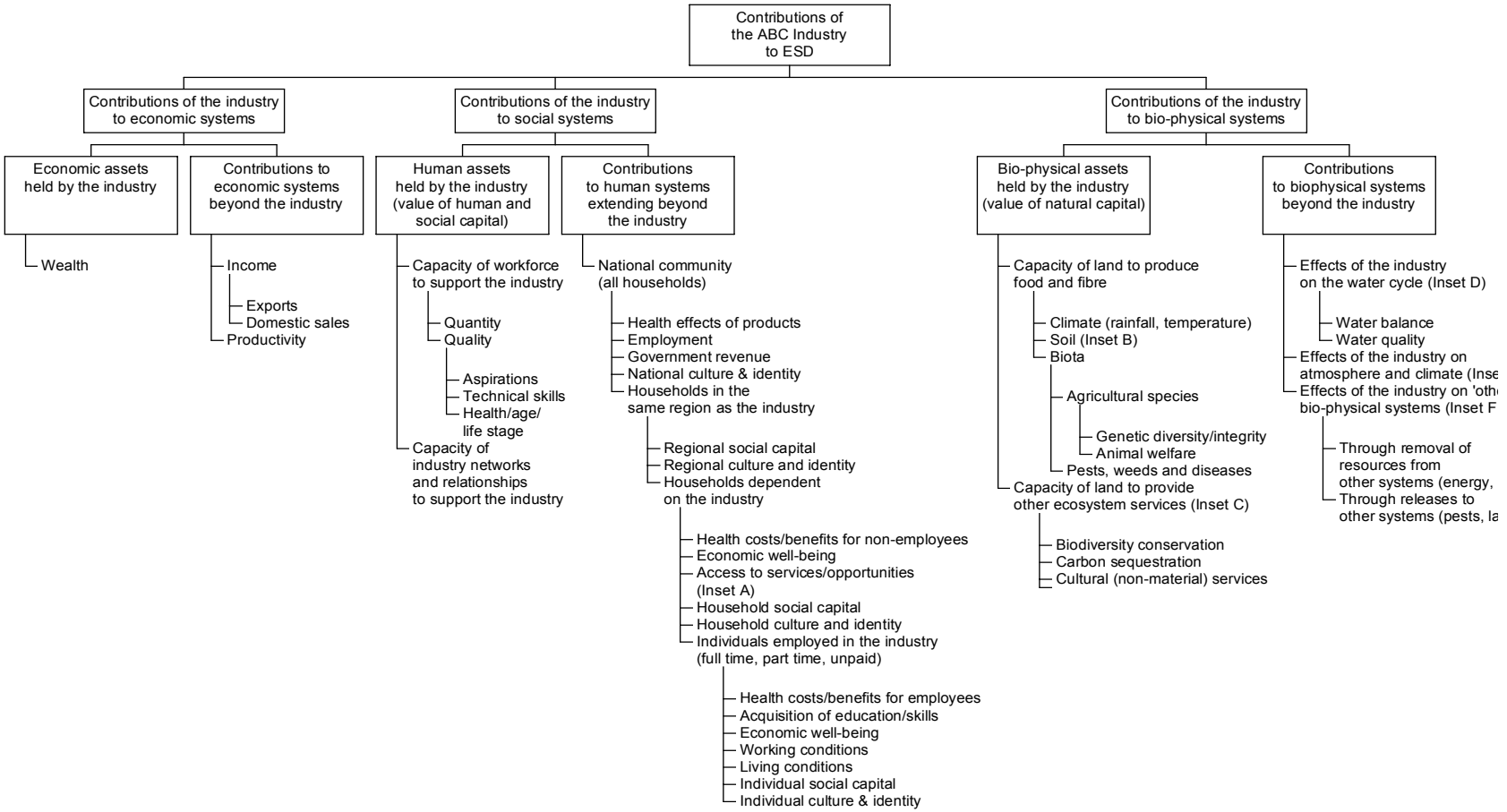


Figure E2. Signposts for Australian Agriculture Generic Component Tree Version 3.

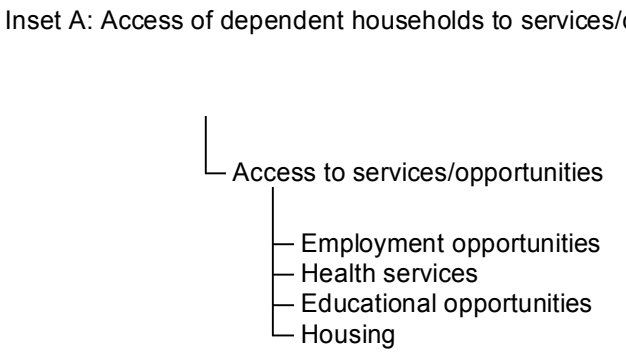


Figure E2. Signposts for Australian Agriculture Generic Component Tree Version 3 (ctd).

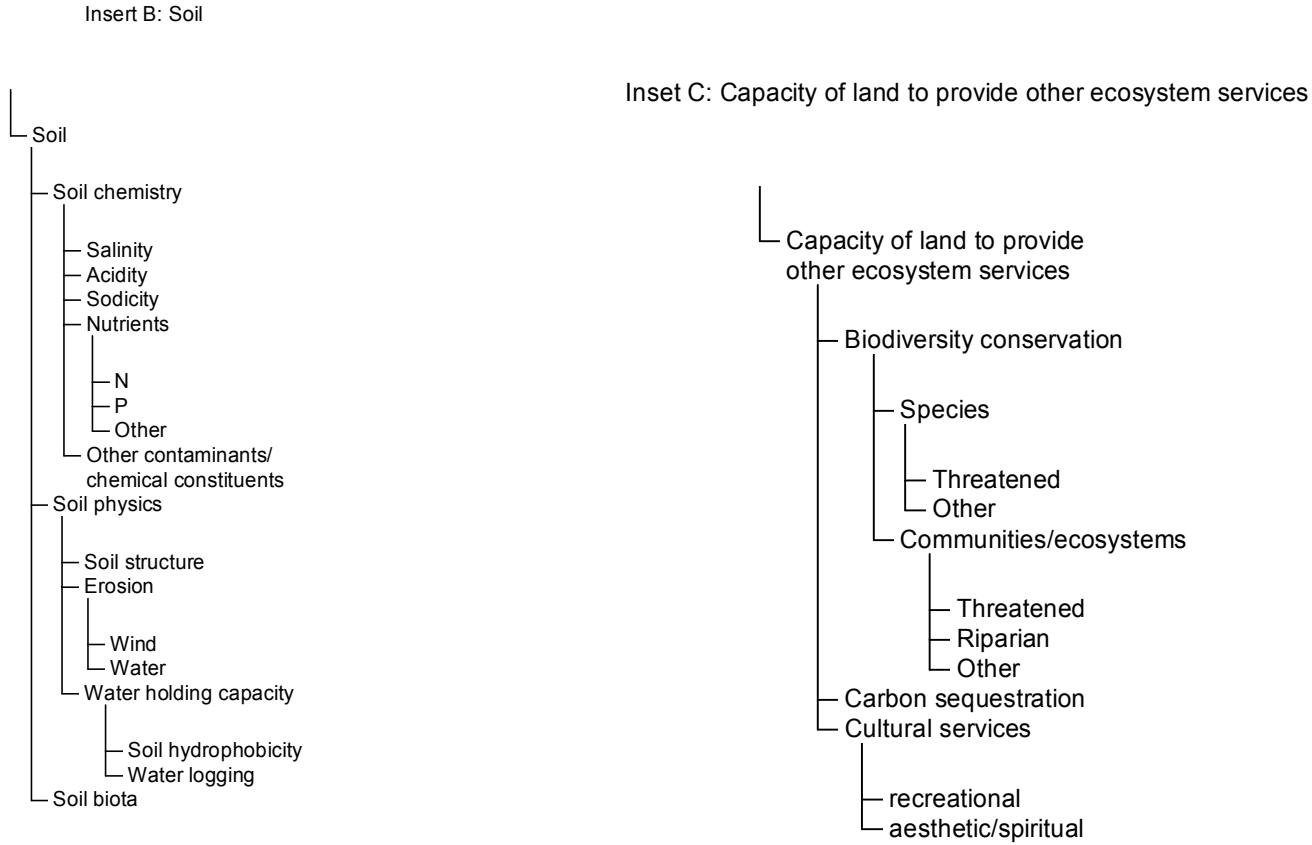


Figure E2. Signposts for Australian Agriculture Generic Component Tree Version 3 (ctd).

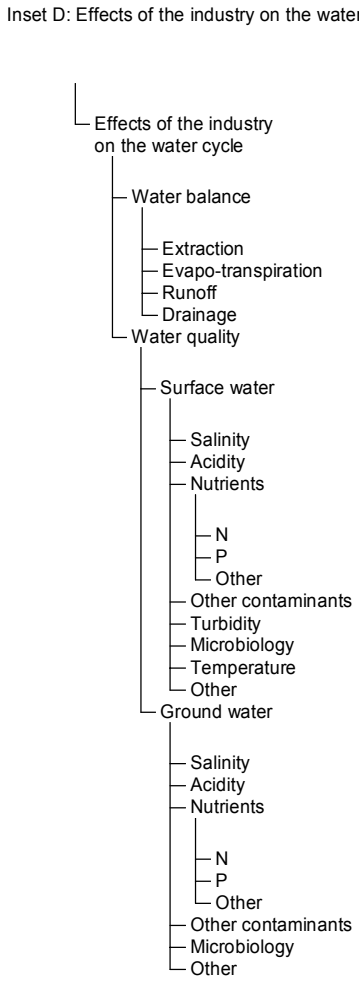
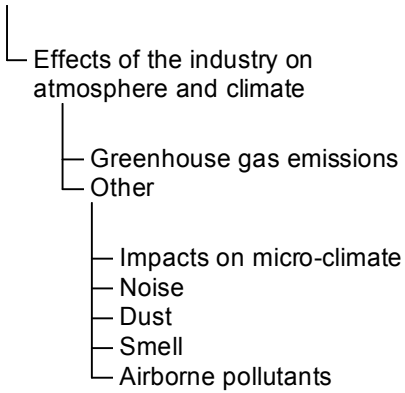


Figure E2. Signposts for Australian Agriculture Generic Component Tree Version 3 (ctd).

Inset E: Effects of the industry on atmosphere and climate



Inset F: Effects of the industry on 'other' bio-physical systems

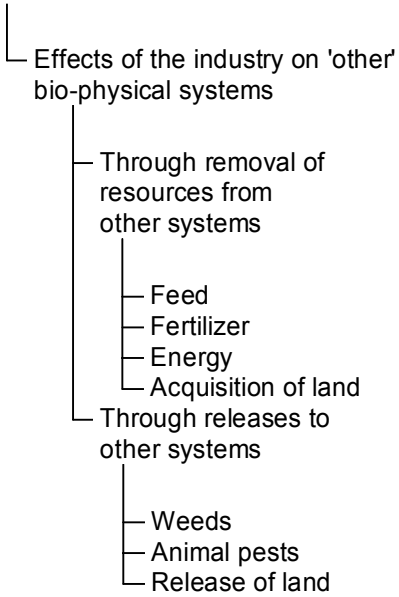


Figure E2. Signposts for Australian Agriculture Generic Component Tree Version 3 (ctd).

Appendix F: Comparisons of *Signposts* with other frameworks

Table F1. Relationships between Signposts for Australian Agriculture and other initiatives.

Initiative	Relationship
National Collaborative Project on Indicators for Sustainable Agriculture (SCARM 1998)	The *Signposts* framework builds on this previous work but has a slightly different question and a more specific subject (individual industries rather than agriculture as a whole). The *Signposts* framework covers more components and will not exclude components just because data are currently unavailable. The *Signposts* framework is more flexible as it is defined first by its structure then by desired outcomes and then by indicators. The SCARM framework is defined primarily by its indicators and therefore a change in an indicator implies a change in the entire framework. All SCARM indicators have a potential role in the *Signposts* framework but not necessarily at equivalent levels. For example the SCARM natural resource condition indicators address 'state of agricultural lands' components; the SCARM 'level of farmer education' addresses the human capital component within industry participants; and the SCARM 'extent of participation in training and Landcare' addresses a pathway component intended to effect changes in resource condition.
National Food Industry Environmental Sustainability Initiative (Allan Consulting Group 2004)	The subject is a food product rather than an agricultural industry. The question is essentially the same as the *Signposts* framework but with scope restricted to environmental contributions. There is a significant area of common interest for the environmental components of the agricultural production sector of the supply chain. The *Signposts* framework could inform the structure and choice of indicators for NFIS.
Proposed Environmental Reporting Framework for the Australian Food Industry (Signposts Stage 5 project, August 2006)	A development following from the entry above. The proposed framework generalises the *Signposts* primary production framework so that it is applicable across all sectors. A complete chain evaluation is achieved by each sector combining information on their own performance with compatible information from their suppliers and passing the information on to their customers.
National NRM Monitoring and Evaluation Framework	The *Signposts* framework is designed to use National NRM M&E resource condition indicators and identify the contribution of agricultural industries to the achievement of national Matters for Target related to soil condition, water quality and biodiversity.
National ESD Reporting Framework for Australian Fisheries	Subject is a fishery. Question is 'How does the fishery contribute to ESD?' The reporting framework was developed using the same process that was subsequently applied to generate *Signposts*. The reporting framework is now widely used amongst Australian jurisdictions and has been adapted for use in the Pacific and also within the aquaculture industry. Main difference between the component tree for fisheries and for agriculture is the form of the 'biophysical assets.' For fisheries, the major biophysical asset is the harvested fish stocks. Other bio-physical contributions fall under the 'contributions to biophysical systems beyond the industry' branch.
Primary Industries and Energy Research and Development Act 1989	The *Signposts* framework should improve accountability by articulating the objects of the Act thereby making them more amenable to evaluation and reporting. The framework articulates the economic, environmental and social benefits (positive and negative) derived from primary industries and the components of

Initiative	Relationship
	sustainable use and management.
State of Environment Reporting	The *Signposts* framework is designed to contribute to reporting on the state of agricultural lands and to use State of Environment indicators where appropriate.
Environmental Management Systems	The *Signposts* framework provides a basis for determining the content (as opposed to the process) of environmental management systems (EMS) at any level (government, industry, individual farm). Since the framework is defined by components and desired outcomes rather than by indicators, an EMS may choose to address a subset of the components, adopt the same or compatible desired outcomes (adapted to the scale of the EMS) and select indicators to suit its own requirements. Management practices identified in an EMS can be pathway components in the Signpost framework. The *Signposts* framework covers more than just environmental components. The scope of an EMS can be similarly extended. Aggregated industry information collected in a compatible EMS could feed into the *Signposts* framework. Some information collected for the *Signposts* framework may be used in an EMS (more likely for regional and higher level EMS rather than individual property EMS).
OECD Agri-environmental indicators	Essentially a list of indicators with relatively little structure. The indicators are not always relevant to Australian circumstances. The Signpost framework can assist reporting to OECD. The structure of *Signposts* framework could be used to influence further development of OECD indicators.
National Agricultural Monitoring System (NAMS)	The subject is a region – boundaries definable by the user. The web-based tool contains data for use in the application and assessment processes for Exceptional Circumstances, initially for dryland/broadacre industries but expanding into irrigated and intensive industries. The question being addressed is 'How well does the region meet the criteria for Exceptional Circumstances?' Focus is on climatic and production data updated frequently. Information from NAMS will be used directly for the climate component of *Signposts*, but reported less frequently (eg annually rather than weekly). There are possible synergies with other *Signposts* components under 'capacity to produce food and fibre.' NAMS is not concerned with social or off farm impacts of agricultural industries or broader economic impacts beyond the criteria for Exceptional Circumstances.
Integrated Catchment Condition Projects (National Land & Water Resources Audit)	Subject is a 'catchment' or some other spatially-defined entity. Question is 'What is the condition of the catchment?' Components have been developed to maximise consistency with the bio-physical assets branch of *Signposts*. The projects have generated a generic regional reporting framework that mirrors the stocks and flows structure of *Signposts*.
Balancing Act: A triple bottom line analysis of the Australian Economy (Foran et al 2005)	Subject is each of 135 economic sectors. They include primary industry sectors such as sheep and shorn wool, barley, rice, wheat and other grains, etc. as well as manufacturing and service sectors. Reports on triple bottom line performance using three financial (profit, export propensity, import penetration), three social (employment, income, government revenue) and four environmental indicators (greenhouse gas emissions, primary energy use, managed water use, land disturbance). Performance of entire 'upstream' chain is embodied in each result. Question and overall approach essentially the same as *Signposts*. Balancing Act looks at all sectors using relatively gross indicators. *Signposts* looks at an individual industry in much greater depth. The extension of *Signposts* along the food value chain relies heavily on

Initiative	Relationship
	the Balancing Act approach.
NLWRA National Coordination Committees	*Signposts* is a user of the data infrastructure, information, indicators etc. developed by the various National Coordination Committees and may influence their future directions. Examples include the use of indicators of capacity to adopt management practices under development by the SENCC, the current and future use of ACRIS soils data.

Appendix G: Workshop

SIGNPOSTS FOR AUSTRALIAN AGRICULTURE

9:30 am to 4:00 pm
Tuesday 16 May 2006
Rydges Lakeside
London Circuit, Canberra

ATTENDEES

Research and Development Corporations	
Grains Research and Development Corporation	Zoltan Lucas
Dairy Australia	Cathy Phelps
Horticulture Australia Limited	Alison Turnbull
Meat & Livestock Australia	Malcolm Sedgwick
Land & Water Australia	Catherine Viljoen
State Agencies	
Department of Primary Industries, Qld	Elton Miller
Department of Primary Industries, Water & Environment, Tas	Duncan Farquhar
Australian Government	
Australian Bureau of Statistics	Allan Nicholls, Jim Williamson
Department of Environment & Heritage	Jane Hosking
Department Agriculture Fisheries and Forestry, Natural Resource Management Division	Tom Aldred, Phil Pritchard, Michelle Baird
Department of Agriculture, Fisheries and Forestry, Food and Agriculture	Christopher Ambler, Laura Fulton
Bureau of Rural Sciences	Jean Chesson, Benj Whitworth, David Carlisle
Australian Bureau of Agricultural and Resource Economics	Tim Goesch, Dale Ashton
National Land & Water Resources Audit	Karen Cody, Blair Wood

SIGNPOSTS FOR AUSTRALIAN AGRICULTURE WORKSHOP

16 May 2006

Main points

- As a community we do not understand the importance of industries and the potential impact a series of restrictions on resource use will have on them. There is need for a good framework for gathering and presenting information on agriculture's contributions.
- The National Land & Water Resources Audit requires a good framework for identifying information needs, data availability and quality.
- The primary clients of Signposts are policy makers - particularly DAFF, State agriculture/primary industries agencies, industry bodies and RDCs. Where fine resolution data is available, Signposts could provide information that was also relevant to regional groups and farmers.
- The proposed changes to the social components as a result of the ANU review provoked extensive discussion and will need to be accompanied by careful explanation.
- Component trees for beef, dairy and horticulture were provided and workshop participants were asked to provide information to assist further development of the industry profiles. See list of detailed comments below.
- Program Managers within the RDCs stated that Signposts needed to attain a higher profile within the RDCs so that sufficient staff resources could be allocated. It was agreed that there was a need to define a process for formally engaging stakeholders.

Key Actions

- DAFF NRM Division agreed that DAFF NRM policy area would take the lead by engaging the Executive Directors of RDCs in a discussion aimed at encouraging a formal allocation of staff resources towards Signposts, with the aim of enhancing RDC guidance/cross-coordination. RDCs were to provide suggestions for peak industry bodies to include in discussions.
- DAFF NRM Division agreed to extend the Signposts project's timeframe/milestones to at least February 2007 to enable stakeholders sufficient time to consult with members and associations, and to incorporate comments.
- BRS will clarify stocks & flows and arrangement of social and ecological components to minimise readers confusion in the Signposts Stage 3a report.
- Workshop participants were asked to provide the following information, in the workshop and afterwards:
    - suggested changes to component trees
    - priority components to be dealt with initially
    - outcomes and information/data to inform components
    - information to inform management practices

- appropriate people to contact within each agency for Q&A from BRS.

Specific comments:

Framework:

- Jim Williamson (ABS) – Believed that the category of individuals under 'social systems extending beyond the industry' would be better placed under the 'Human and social assets held by the industry'. Jim also went into discussion on stocks and flows.

Grains Profile:

- Acidity – First sentence needs to be reworded so policy makers don't have current reaction to the word toxic (currently they may think that the level of acidity in soils is a negative thing)

Industry profiles:

- Sources for data – ABARE and ABS felt that the graphs using Commodity Statistics data should reference both ABS and ABARE as the source.
- Component – Water quality/water quantity – mention was made to the inclusion of a section on security of access to water/water rights.

Dairy:

- Water Quality – Needs to be further subdivided to separate out various sources and subsequent actions, such as point source and non-point source emissions (requires talking to Dairy Australia about issue) and to consider time issue of effects from management practices in the last few years vs' effects from 70 years ago.

Data sources:

- Duncan Farquhar suggested that Signposts could become a one stop shop, for flexible access to data in components, for different needs. (split up by regions etc/ data warehouse arrangement). This was felt to be a possible long-term goal, but unlikely to be achieveable in this project. Duncans sources will be investigated.

Beef: ABS yearbook has not been in publication for some time and my not the best source of information (out of date).

MLA have data/information.

Dairy: Dairy outlook 2006

Dairy NRM

Dairy social reports

(DA representative explained there are currently 8 dairy regions, contact Cathy Phelps for further information)

Bega cheese have report not yet released on pathway of cheese from farm to consumer.

Horticulture: Key contact for obtaining Data from HAL = Andrew Collins (economist)

Other potential data sources mentioned:

- ABS potential to fill in data gaps

- FARMBIZ (source for agriculture education information (not as relevant for NSW)
- ABS NRM survey (demographics)
- National food score card

Appendix H: *Signposts for Australian Agriculture* Reference Group

TERMS OF REFERENCE (as of 11 August 2006)

Membership

Australian Government	Executive Manager, DAFF
State/Territory Governments	Nominated PISC representatives
Industry	National Farmers Federation
Rural R&D Corporations	Nominated RDC representatives
NLWRA	Executive Director
NLWRA Advisory Council	Chair
Regional Body	Nominated representative
Food Industry	Nominated representative

Terms of Reference

To provide advice and guidance on the development of the Signposts project and its products, having regard to ensuring it meets government policy and industry information needs and to support ongoing evaluation of the contributions agriculture provides to sustainable development.

Reporting Arrangements

The Reference Group will provide regular reports on progress, issues arising and future directions to Primary Industries Standing Committee, Industries Development Committee and the National Land & Water Resources Advisory Council on an as needs basis.

Support

DAFF Natural Resource Management Division & National Land and Water Resources Audit to provide required Secretariat support for the development of discussion papers, briefings and reports.

Members (30 November 2006)

Geoff Gorrie	National Land and Water Audit Advisory Council
Blair Wood	National Land and Water Resources Audit
Heather Tomlinson	Department of Agriculture, Forestry and Fisheries
Nataliya Murad	Department of Primary Industries and Fisheries, QLD
Ben Bruce	Department of Primary Industry and Resources, SA
Don Vernon	Department of Primary Industry, NSW
David Hartley	Department of Agriculture and Food, WA
Jan Cristofani	Department of Agriculture, Forestry and Fisheries
Alison Ryan	Department of Agriculture, Forestry and Fisheries
Vanessa Findlay	National Farmers' Federation
Lee O'Brien	Murumbidgee Catchment Management Authority
Dick Wells	Australian Food and Grocery Council
Greg Fraser	Grains Research and Development Corporation
Caroline Lemerle	Rural Industries Research and Development Corporation

Major Outcomes

Meeting 1, 7 April 2006

The Reference Group requested the following for its next meeting:

- A report on the feasibility and practicality of extending the Signposts framework along the supply chain.
- An issues paper on how the Signposts framework can be used to report on the contribution of agriucltural industries to meeting national targets for NRM.
- A short paper documenting the rationale for having a single industry focus for the profiles and options for dealing with mixed farming.
- A report on likely communication products.

Meeting 2, 11 August 2006

- The Reference Group decided that priority should be given to the primary production sector. Extension along the supply chain will depend on resourcs being available and interest by industry in participating.

- The outcomes of the workshop on 16 May were noted and the need to follow up with stakeholders was acknowledged.

Meeting 3, 30 November 2006

- The Communications Strategy for Signposts was endorsed.
- The Reference Group supported the participation of the wine and cotton industries in the project.
- It was agreed that a presentation would be prepared for the Industry Development Committee in January 2007 and that the Reference Group would seek to report to the next Primary Industry Standing Committee meeting.