Socio-economic tools and frameworks for facilitating decision-making in NRM

Discussion paper (final draft for comment)

Prepared for

Natural Resources Commission

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Sheridan Coakes Consulting Pty Ltd

NSW
Suite 6, 500 High Street,
Maitland NSW 2320

Tel: 02 4933 2188 • Fax: 02 4933 2588

WA
Suite 6, 315 Railway Road,
Shenton Park WA 6008

Tel: 08 9226 5388 • Fax: 08 93813140

Email: scoakes@coakesconsulting.com

Website: www.coakesconsulting.com

ABN: 29 085 257 709

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Glossary

CAP	Catchment Action Plan
CMA	Catchment Management Authority
INFFER	Investment Framework For Environmental Resources
KWRP	Kooragang Wetlands Rehabilitation Project
NRC	Natural Resources Commission
NRM	Natural Resources Management
NSW	New South Wales
ROI	Return on Investment
SIA	Social Impact Assessment
SROI	Social Return on Investment
TRC	Town Resource Cluster

1.0 Introduction

In November 2011, the Natural Resources Commission (NRC) commissioned Coakes Consulting (Coakes) to develop a brief discussion paper outlining potential approaches and methodologies that may assist CMAs to better understand the linked socio-ecological systems operating in their catchment. In particular, the NRC requested that Coakes undertake an investigation of socio-economic tools and frameworks that may be applied by CMAs to measure the contribution of natural resource management (NRM) to economic sustainability and social well-being.

1.1 Background

For the past five years, Catchment Management Authorities (CMAs) have been implementing previously approved Catchment Action Plans (CAPs). A CAP sets out the long-term strategic direction for management of natural resources within a catchment, including objectives, timetable, activities, and investment in NRM activates over a 10-year period. The NRC assesses each CAP and makes a recommendation to government, which is then responsible for approving each CAP. The CMAs are now in the process of upgrading their existing CAPs.

In August 2011, the NRC published a framework explaining how it would be assessing and recommending upgraded CAPs (NRC, 2011a). This framework sets out the NRC's expectations relating to the processes by which CAPs are upgraded, and the quality and content of upgraded CAPs.

The NRC has determined that one of the key assessment criteria on which it will review each upgraded CAP is the extent to which it "uses best available information to develop targets and actions for building resilient landscapes". Specifically, the NRC has provided guidance that this criterion is met if there is evidence that the upgraded CAP exhibits the following attributes:

- describes the socio-ecological systems operating in the catchment using best available science and knowledge of community values;
- integrates the biophysical and socio-economic information to analyse systems operating in the catchment and develop strategies for improving landscape function and resilience; and
- proposes targets and actions that are logically nested and supported by available evidence.

1.1.1 Community targets

In 2005, the NSW Natural Resources Commission (NRC) recommended to Government the adoption of state-wide targets to guide the management of the State's natural resources (NSW Government 2006). These targets include a suite of 13 resource condition and community targets that contribute to the achievement of NRM in NSW, which have four key focus areas: biodiversity, water, land and community.

The community targets (Targets 12 and 13) recognise the fundamental inter-relationships between natural resource, economic and social outcomes, reflecting a natural resource policy directive of the NSW Government (NRC 2005a):

- **Target 12:** Natural resource decisions contribute to improving or maintaining economic sustainability and social well-being.

- **Target 13:** There is an increase in the capacity of natural resource managers to contribute to regionally relevant natural resource management.

Feedback from some CMAs has indicated that they face a number of challenges in monitoring and evaluating performance against these community targets. Much of this feedback has focussed on the difficulties typically faced by many organisations when attempting to measure social outcomes, including (a) a lack of relevant or readily available data, (b) a lack of resources or skills and expertise, and (c) challenges in measuring "intangible" outcomes in complex systems where many factors are at play. It is noted that the NRC's 2010 Progress Report recommends that government supports revision of the state-wide targets.

1.2 Aim of paper

Given that (a) CMAs are now preparing their upgraded CAPs, (b) there is a need as dictated by the NRC's assessment framework for CMAs to demonstrate in their CAP an attempt to draw upon information obtained through socio-economic assessment, and (c) that some CMAs to date have found socio-economic assessment challenging; the purpose of this paper is to provide some practical guidance to CMAs in relation to socio-economic tools and frameworks that may assist them to measure outcomes relating to the two community targets.

The report has been structured such that the different tools and frameworks are organised according to key questions that CMAs are likely to be interested in exploring during their CAP upgrade process. It is suggested that CMAs use this paper to identify tools and frameworks that may be suitable for further investigation into their applicability and appropriateness for their respective CAP upgrade. While some of the methods are explained with a high level of detail, and with some work examples (particularly in the appendix), this report is not intended to be a detailed instruction manual and should instead be seen as a paper that provides guidance on what tools and frameworks are available for further application.

2.0 Tools and frameworks for socio-economic assessment during catchment planning and implementation

There are a range of tools and frameworks available that could assist CMAs to undertake socio-economic assessment during various stages of catchment planning and implementation. The following section provides a brief discussion of a selection of these tools and frameworks, organised in relation to key questions that CMAs may be exploring as they work towards upgrading their CAPs.

From the perspective of individual CMAs, the value or appropriateness of each of these methods will depend on a number of factors (e.g. specific objectives and available resources). As such, this section is only intended to provide guidance to CMAs on what tools and frameworks are available, and how they might address particular questions that may relate to NRM and catchment planning.

The following chart (Figure 2.1) provides an overview of some of the key questions that CMAs may wish to explore, organised into a logical and chronological sequence of possible objectives. The questions begin with a focus on first identifying key NRM stakeholders within the catchment, and understanding what natural resources are valued and why. Following this, the questions focus on further developing an understanding of how natural systems and social systems within the catchment are inter-related. The focus then shifts to information that will assist in prioritising and selecting NRM investments that are most likely to deliver maximum value. The final questions are concerned with monitoring the effectiveness of NRM investments and the overall economic sustainability and social well-being of communities within the catchment.

Figure 2.1: Key questions, organised by potential CMA objectives.

There are many ways that each of the questions in Figure 2.1 may be addressed by CMAs. The remainder of this section will describe a selection of the socio-economic tools and frameworks that may be suitable for addressing each question. Table 2-1 presents these methods, which are organised according to the key questions from Figure 2.1 that they may be used to address. Each method is then described in more detail in the sub-sections that follow.

Table 2-1: Tools and frameworks for socio-economic assessment

Stage	Questions	Tools and frameworks
Planning	• Who are our stakeholders and what are their issues?	• Stakeholder identification and analysis
	• What do our stakeholders value, and how do they use natural resources within the catchment?	• Values mapping
	• What are the social networks among our stakeholders, and what are their links to natural resources within the catchment?	• Social networks analysis • Influence diagrams
	• How can we describe the socio-economic clusters within the catchment?	• Social clusters analysis • Community capacity assessment
	• How can we understand what enables and constrains our stakeholders in participating in sustainable NRM?	• Natural resource manager capacity assessment
	• How do we prioritise relevant projects to address CAP priorities and capacity needs?	• Investment Framework for Environmental Resources (INFFER)
Implementation (monitoring & evaluation)	• How do we monitor and evaluate the outcomes of NRM programs?	• Social Return on Investment (SROI) analysis
	• How do we monitor and evaluate economic sustainability and well-being at the community level?	• Community capacity assessment
	• How do we monitor and evaluate adaptive capacity of land holders/ natural resource managers?	• Natural resource manager capacity assessment

2.1 Planning

The following section outlines a number of tools and methods that may be useful during the planning stage, organised according to key questions. Many of these early questions focus on developing a thorough understanding of who and what will be affected by NRM decisions, and why.

2.1.1 Who are our stakeholders and what are their issues?

The key stakeholders relevant to NRM are likely to be already well known to CMAs. Nevertheless, identifying stakeholders and understanding their concerns is usually critical in any change project or evaluation, and some CMAs may wish to develop their existing approach to stakeholder identification and analysis.

In many cases, simple activities such as brainstorming and internal discussions within CMAs, in combination with existing knowledge, should prove sufficient to develop an appropriate list of stakeholders and an understanding of their issues,

motivations, values, and priorities. However, there are many readily available tools and frameworks available that might further assist CMAs to better understand stakeholders, which will enable more informed planning and decision making.

2.1.1.1 Stakeholder identification and analysis

There are multiple ways to identify and better understand stakeholders. Indeed, Bryson (2004) provides a useful summary of as many as fifteen different techniques for stakeholder identification and analysis. Such techniques typically begin with simple brainstorming by internal project teams to identify a list of all potential stakeholders. Following this, various levels of analysis can be applied to organise stakeholders according to different criteria that may be deemed relevant to the issue or project/program being considered. These analyses can then inform a range of next steps, including communication methods and management strategies.

A commonly used stakeholder analysis framework is the “power versus interest grid” described in detail by Eden and Ackermann (1998). This framework encourages the analyst to consider stakeholder groups on two dimensions: their interest in the outcome, and their power to affect the outcome.

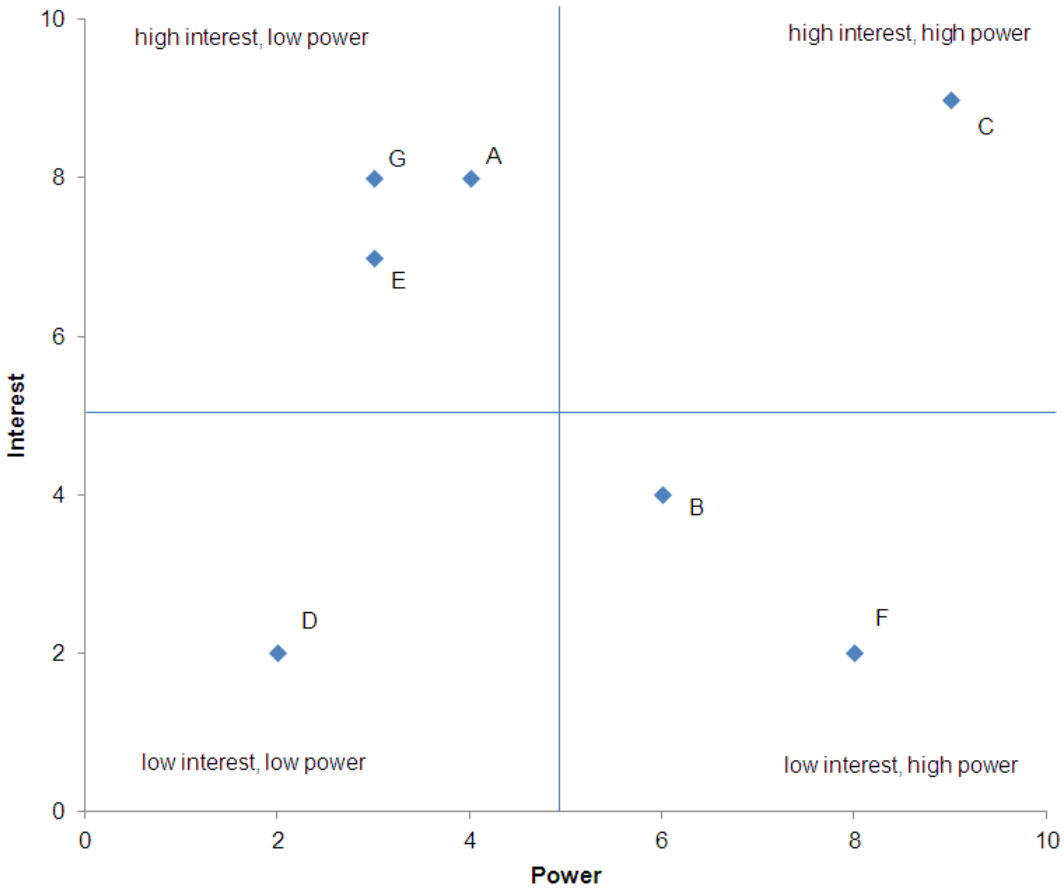


Figure 2.2: Power versus interest grid.

The “power versus interest grid” is particularly useful in political or controversial situations where there are competing interests. For example, when managing a

project that is likely to be opposed by more than one group, it is useful to determine which group has the greatest power over the outcome, as this will enable a more focussed strategy for engaging and managing that group.

A similar framework, which may be useful to some CMAs, is the “policy attractiveness versus stakeholder capability grid” (Bryson et al., 1986). This method is particularly useful when “power” is shared and there are common interests among stakeholders.

The attractiveness versus stakeholder capability grid involves assessing the attractiveness of policies, plans, proposals, or options in general against stakeholders’ capacities to implement them. Again, stakeholders are rated on two dimensions: attractiveness (of the proposal, from their perspective) and capacity (see Figure 2.3). This particular framework is likely to be useful when CMAs are considering NRM investments such as incentive programs to encourage sustainable NRM practices by landholders. Furthermore, information obtained via natural resource manager capacity assessment (described later in Section 2.1.5.1) may be useful when integrated with this framework.

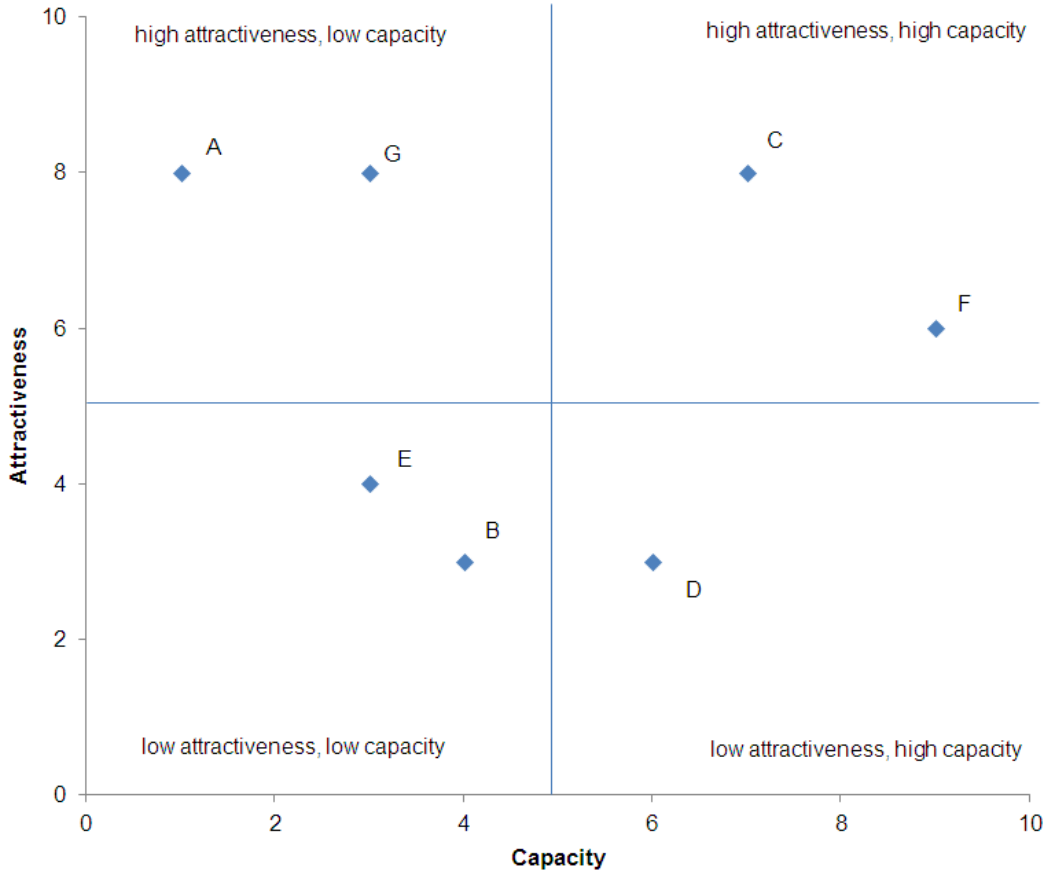


Figure 2.3: Attractiveness versus stakeholder capability interest grid.

2.1.2 What do our stakeholders value, and how do they use natural resources within the catchment?

Following identification of key stakeholders, an important question for CMAs is likely to relate to what natural resources within the catchment are used and valued by different stakeholder groups. An understanding of how different natural resources are used and valued will inform the prioritisation of these resources as targets for NRM interventions designed to improve their condition.

In addition to normal consultation mechanisms such as stakeholder interviews, a technique known as values mapping (described in 2.1.2.1 below) can provide a useful means by which to identify and even quantify the relationships that exist between humans and natural assets within the catchment.

2.1.2.1 Values mapping

Values mapping involves asking stakeholders to identify areas of use or value on a map via surveys or other consultation methods. This enables identification of areas with high usage and / or value, from the perspective of different stakeholder groups, which is important for the purposes of prioritising systems for NRM decision making.

The technique is relatively straightforward to implement, in that it involves asking stakeholders to simply point out areas they use or value, and describe why. The analyst then tallies the responses and maps them spatially. The types of values and uses identified by stakeholders may relate to the following:

- Economic
- Environmental
- Historic, cultural, or heritage
- Infrastructure
- Recreational (e.g. amenity and enjoyment of the local environment)
- Social and community values (e.g. features that people consider important).

Figure 2.4 shows an example of values mapping by residents of a small, remote community in Western Australia (Coakes Consulting, 2011). As shown, values and uses are quantified (refer to the legend) indicating areas of high versus low value and usage.

An advantage of values mapping is that it allows for an understanding of how various natural systems are used or valued for different purposes, and provides insight into conflicts in use and/or value between different stakeholder groups. As shown in Figure 2.4, some resources can have a range of values and uses associated with them, ranging from cultural and recreational activities, to commercial activities. Such information is useful for making informed decisions in the planning phase as to the appropriate areas to prioritise for further assessment.

Although values mapping is fairly easy to undertake, it does often depend on achieving an adequate representation of stakeholders in order to build a clear and reliable image of how values and uses are distributed among natural resources within a landscape. As such, the resources required to undertake values mapping will sometimes depend on the number of stakeholders that must be consulted to achieve an appropriate sample size, especially if face-to-face methods are necessary. In

some cases, it may be appropriate to use an online values map survey, and doing so may be less expensive and time consuming than face-to-face methods.

The Central West CMA has recently used values mapping during the development of its recent CAP upgrade (CWCMA, 2011). Community members were provided with a large map of their area and were asked to identify areas they valued within the catchment. Through this process, the Central West CMA found that valued areas ranged widely both in terms of type and scale.

This information was integrated into the Central West CMA's use of the INFFER process (described later in Section 2.1.6.1) to rank natural assets, on the basis of priorities and values, for NRM investment.

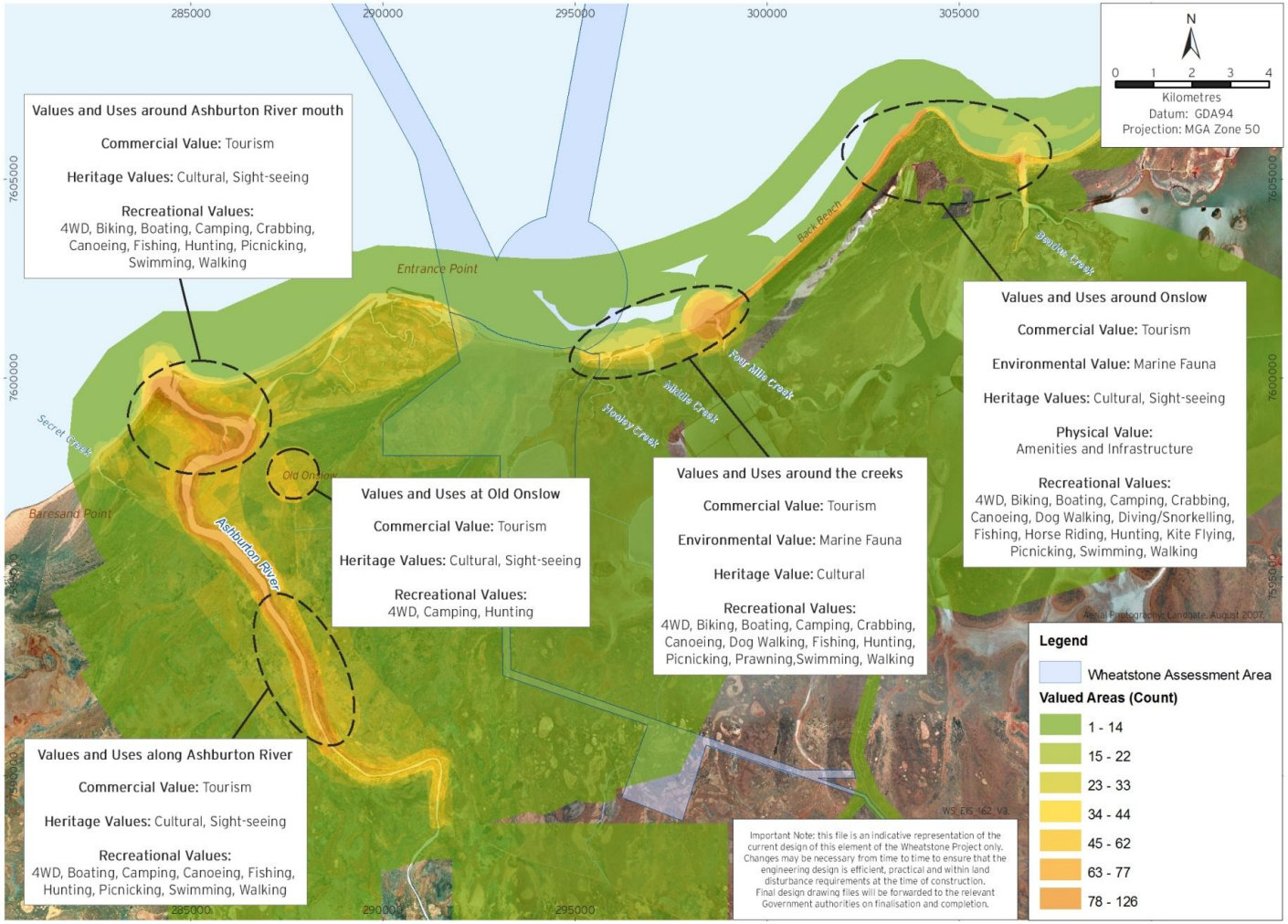


Figure 2.4: Example of values mapping.

2.1.3 What are the social networks among our stakeholders, and what are their links to natural resources within the catchment?

Once stakeholders are identified and their relationships with natural resources (values and uses) within the system are more fully understood, it may be appropriate for CMAs to further explore how stakeholder groups are inter-related through social networks, and how these networks are linked to ecological variables within the catchment. Exploring this question encourages a view of the catchment as a system that includes interacting and inter-dependent social and ecological variables, where changes in one variable can affect other variables within the system. Gaining an understanding of these inter-dependencies and associations will help to better inform the selection of programs to improve or maintain the resilience of the overall system.

The two methods described below may assist CMAs to better understand the linked socio-economic systems within their catchment. These methods include: social network analysis, to examine the relationships/ties among various stakeholder groups that use and value resources within the catchment; and interconnectivity analysis, to examine linkages and relationships among social, economic and ecological system variables.

2.1.3.1 Social networks analysis

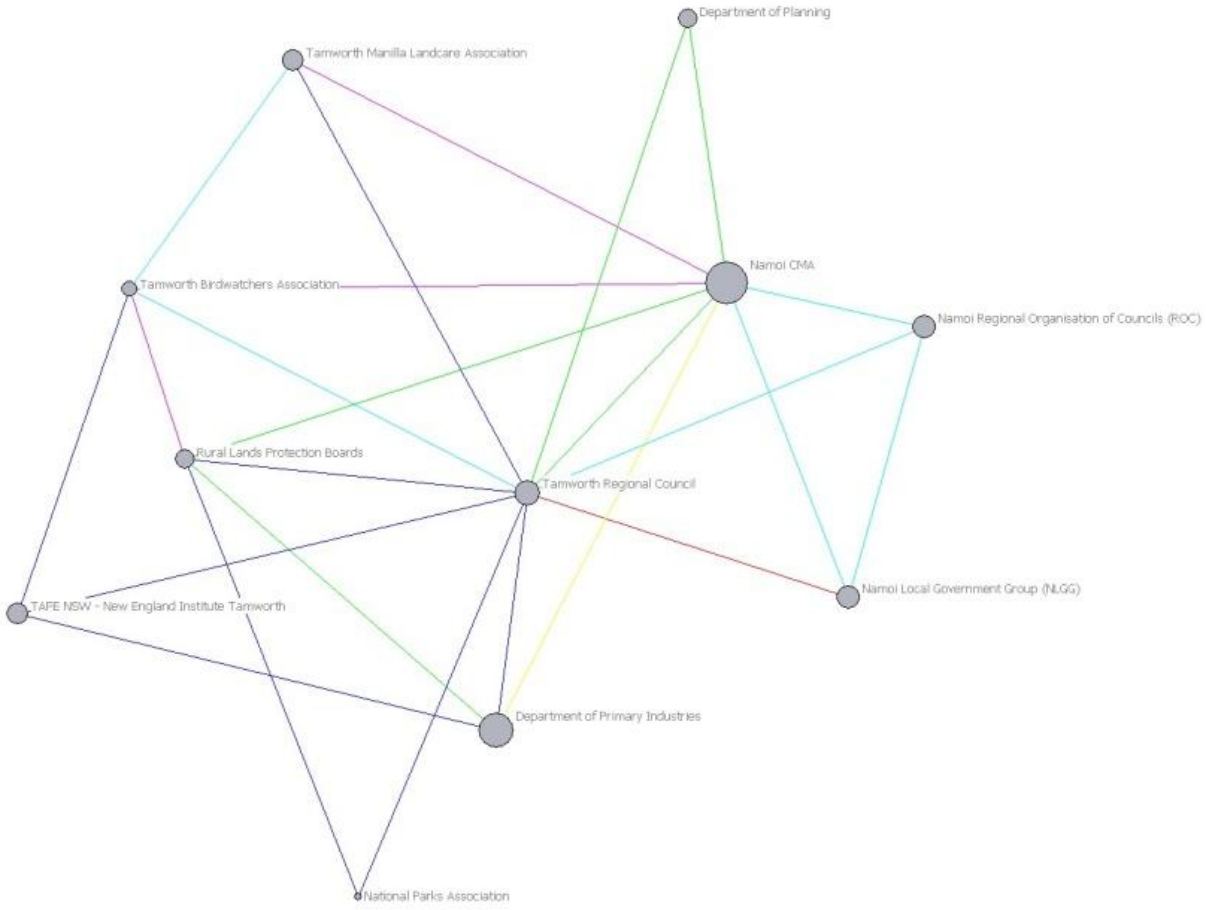
Social network analysis views social relationships in terms of nodes and ties. Nodes are individual stakeholders or groups within the networks, while the ties represent the relationships/flows between the stakeholders. These nodes and ties are able to be displayed visually and mathematically (based on responses to a survey) in a social network diagram or map illustrating all the relevant ties between the nodes being studied.

Social networks can also operate on many different levels (i.e. family, group, community, neighborhood, locality etc), which provides insights into how people and groups relate to each other, address issues, and work collectively to achieve objectives and goals. Social network analysis can also be used to determine the social capital or capacity of individual stakeholders.

Importantly, social network analysis can be used to:

- Identify, determine and map the strength of ties and interaction between key stakeholders and community members / groups, characterising the many formal and informal connections between members;
- Inform which stakeholders may be more likely/comfortable working together in relation to particular impact issues or strategy development;
- Determine who holds various roles and groupings within a network(s), by gaining insight into the following questions:
  - Who are the connectors, leaders, bridges, isolators, etc?
  - Where do clusters exist and who do these clusters constitute?
  - Who is the core of the network(s)?
  - Who is on the periphery?

  For example, greater power and capacity may often come from the degree to which individuals or groups within a network are central to many other relationships.



Source: Coakes Consulting (2008)

Figure 2.5: Stakeholder Network Map – Namoi Partnership Analysis.

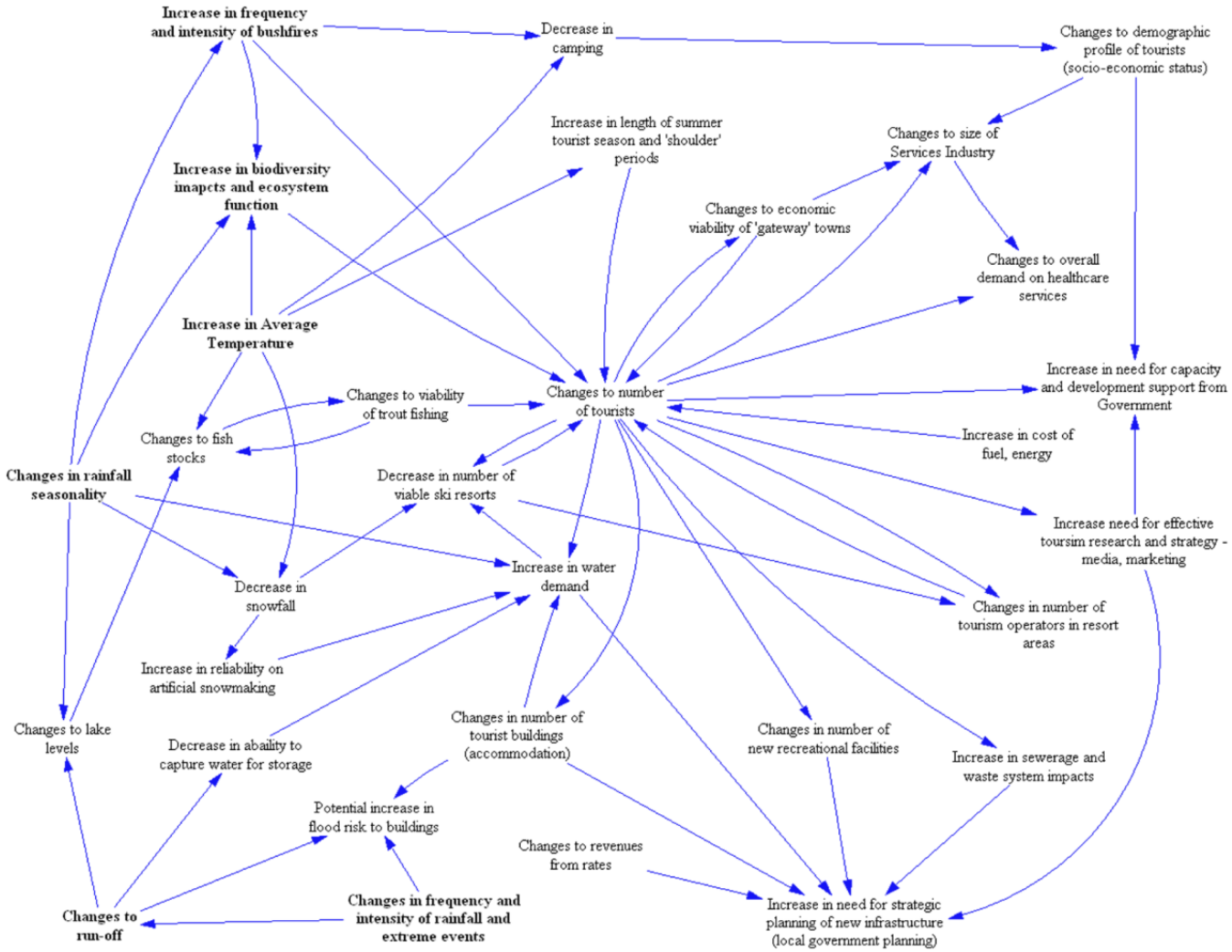
This information while useful at the stage of strategy development may also be helpful in guiding NRM initiatives later on in the assessment process, by highlighting individuals or groups and organisations that may be effective partners in different community projects and those who could potentially work effectively with CMAs on relevant social, economic and environmental issues.

A range of different software applications are readily available to assist CMAs in the development of social network analysis and diagrams.

2.1.3.2 Influence diagrams

Influence diagrams are a descriptive assessment of the pathways and dependencies that exist between variables within a system. This type of analysis involves mapping out relationships between various factors, issues, and impacts, in consultation with relevant stakeholders. This analysis is distinct from social networks analysis because it includes non-social factors and issues that may nevertheless play an important role in the system. In this sense, influence diagrams may be a useful way for CMAs to more fully describe systems, including the links between social and ecological variables.

Figure 2.6 displays an example of an influence diagram, which links the relationships between various social, economic, and environmental variables in the context of alpine tourism. Understanding a system in this manner affords greater appreciation of how change in one variable can have consequences for other variables, therefore affecting the system as a whole.



Source: Lee, Jacobs, & O'Toole

Figure 2.6: Influence diagram describing the Alpine Tourism sector for South East NSW.

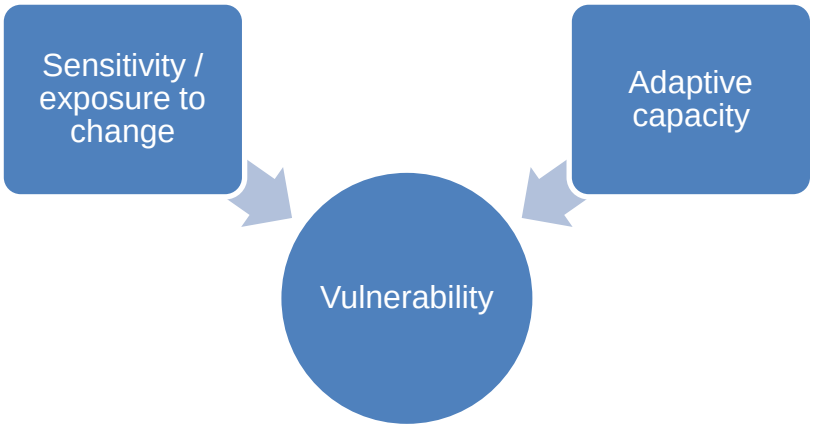
2.1.4 How can we describe the socio-economic clusters within the catchment?

The key questions, tools, and frameworks discussed so far can assist CMAs to develop an initial understanding of how social and ecological systems are interrelated. These methods can therefore help to identify the socio-economic catchment associated with a particular resource. A socio-economic catchment refers to the group of stakeholders or communities that are dependent (directly or indirectly) on a particular natural asset and would therefore be affected by changes in resource condition. Some CMAs may wish to more fully explore and describe the nature of these socio-economic catchments. For instance, CMAs may wish to describe and quantify the nature of a catchment or community's socio-economic dependence on natural resources, or the economic sustainability and social well-being of communities within the catchment.

"Social clusters analysis" (a technique developed by Coakes Consulting) provides a way of measuring and quantifying the nature of the relationships between communities and natural resources within a system. This serves to make a quantitative assessment of a socio-economic catchment's *sensitivity* to change in resource condition. A social catchment can be considered "sensitive" to change in a natural resource if it is highly dependent on that resource, either directly or indirectly, through socio-economic relationships to the resource. For example, if a particular community is highly dependent on an area of agricultural land, then that community will be sensitive to changes in the condition of that land, while other communities that are not part of the

socio-economic catchment associated with that land will not be sensitive to changes in its condition.

However, two communities or social clusters that are equally sensitive to changes in the condition of a particular natural resource may differ in their *vulnerability*, due to differences in their *adaptive capacity*. In other words, one community may be better equipped to respond and adapt to changes in the resource than the other. This relationship between sensitivity, adaptive capacity, and vulnerability is depicted in Figure 2.7 (e.g. Lee, Jacobs, & O'Toole, 2010).



Source: Adapted from Lee, Jacobs, & O'Toole (2010)

Figure 2.7. Model for understanding vulnerability, and its relationship with sensitivity and adaptive capacity

In summary, social clusters analysis serves to identify and then quantify the socio-economic linkages between particular resources and communities, allowing for an estimation of those communities' sensitivity to changes in resource condition to be made. Community adaptive capacity analysis is a separate method that can be used to measure and quantify a community's capacity to adapt to change. It is based on the premise that communities draw upon their assets (financial, human, social, physical, and natural) in response to threats or shocks. Assessing the status of a community's assets can allow for a quantitative analysis of its overall adaptive capacity. Social clusters analysis and community adaptive capacity analysis are described in more detail in Sections 2.1.4.1 and 2.1.4.2 below.

2.1.4.1 Social clusters analysis

Social clusters analysis identifies and spatially represents the socio-economic connections and associations between people (communities, stakeholder groups) and natural resources, and is explained in more detail in Section 5.1.1.

The approach is based on Town Resource Cluster analysis, first developed by Dr Mark Fenton and Dr Sheridan Coakes for the Australian RFA social assessment process, and provides an important framework for understanding the linkages between natural and social systems.

As outlined in Fenton, Coakes and Marshall (2003), the approach is based on the premise that there are two systems that are critical components of any approach to SIA within NRM and planning:

1. Resource systems – which are defined with reference to satisfying human needs and in terms of their utility value to social systems; and

2. Social systems – that may be characterised in terms of a number of underlying qualities, that include biophysical, health, cultural, social, political/legal, economic and psychological components (Gramling and Freudenburg, 1992). Within an NRM context, these underlying qualities include property rights, land and resource tenure systems, systems of knowledge relevant to environment and resources and world views and ethics concerning environment and resources (Berkes and Folke, 2000). As Slootweg et al (2001) outline many of these systems and subsystems interact and are not independent.

A key component of social clusters analysis involves identifying the dependency and or associations that exist between human or social activities and a natural resource area or unit. For example, it is often the case that communities will have an economic or subsistence dependency on a natural resource through activities of resource extraction (i.e. mining, timber harvesting, and agriculture) or direct use (i.e. recreation, leisure, tourism).

A social clusters analysis has two core objectives:

1. To develop meaningful spatial units (social clusters) on which to ground social impact and assessment processes – in the management of natural resources, management agencies often define areas on the basis of arbitrary, pre-defined boundaries. These units are usually classified on the basis of specific ecological and resource management characteristics, however there is no corresponding unit associated with the social environment.

2. To establish a relationship between the use of the natural resources and specific communities (socio-economic catchments). Such a relationship allows an understanding of the potential social impacts likely to be experienced by communities and townships as a result of changes in the management and use of natural resources.

Some examples of graphical outputs from social clusters analysis are presented in Figure 2.8 and Figure 2.9 below. The first example (Figure 2.8) displays the direct and indirect linkages that exist between communities and the natural resource being managed, which in this case was the East Gippsland Forest Management Area. The second example (Figure 2.9) displays the relationships that exist between communities on the basis of employee household expenditure flows. The employees rely on income from their work in industries that have a dependence on the forest resource being managed, and therefore these communities will be affected by any NRM decisions affecting the resource.

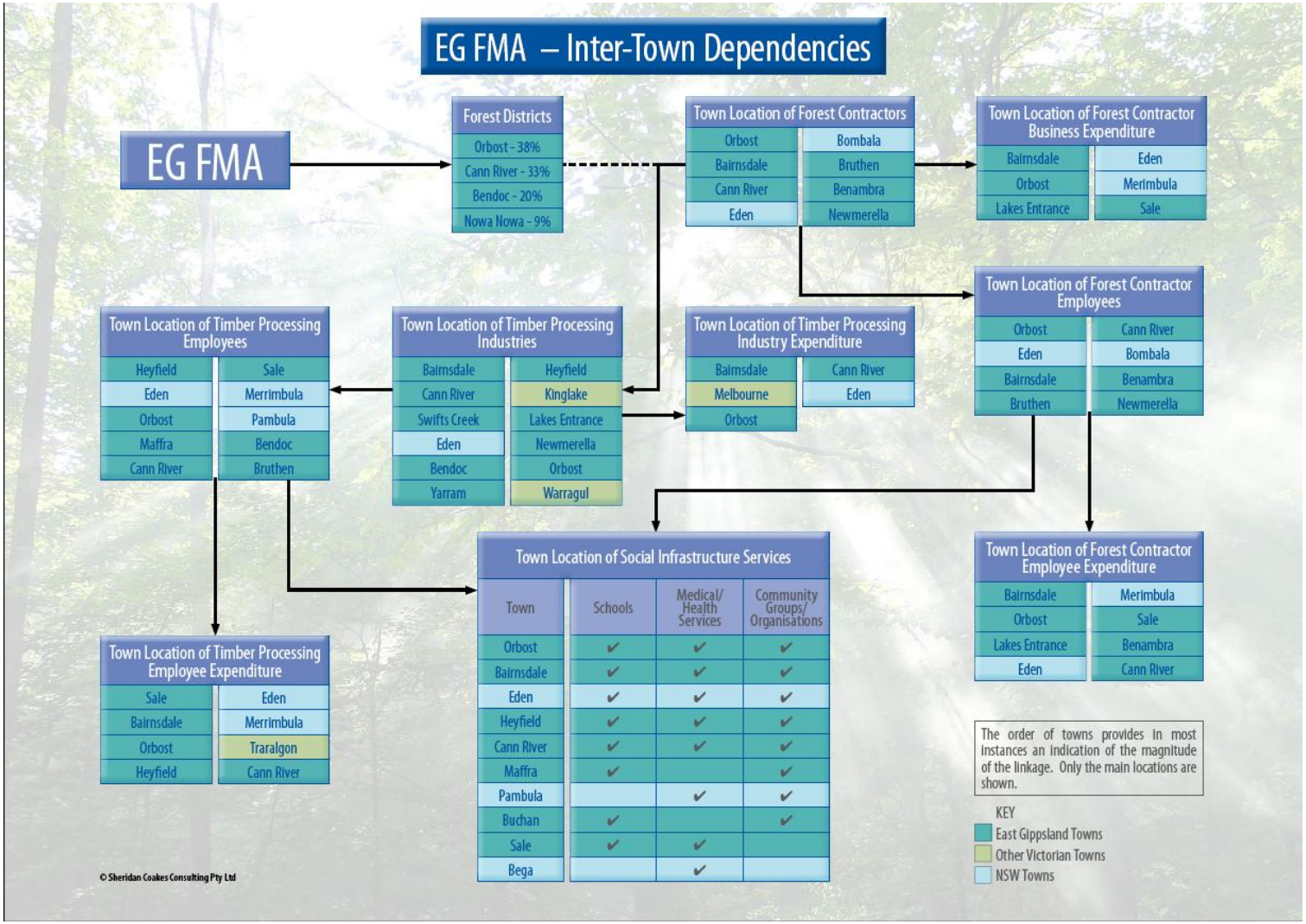


Figure 2.8: Example of output from social clusters analysis. Figure displays conceptual links between natural resources (the East Gippsland Forest Management Area, or "EG FMA") and communities.

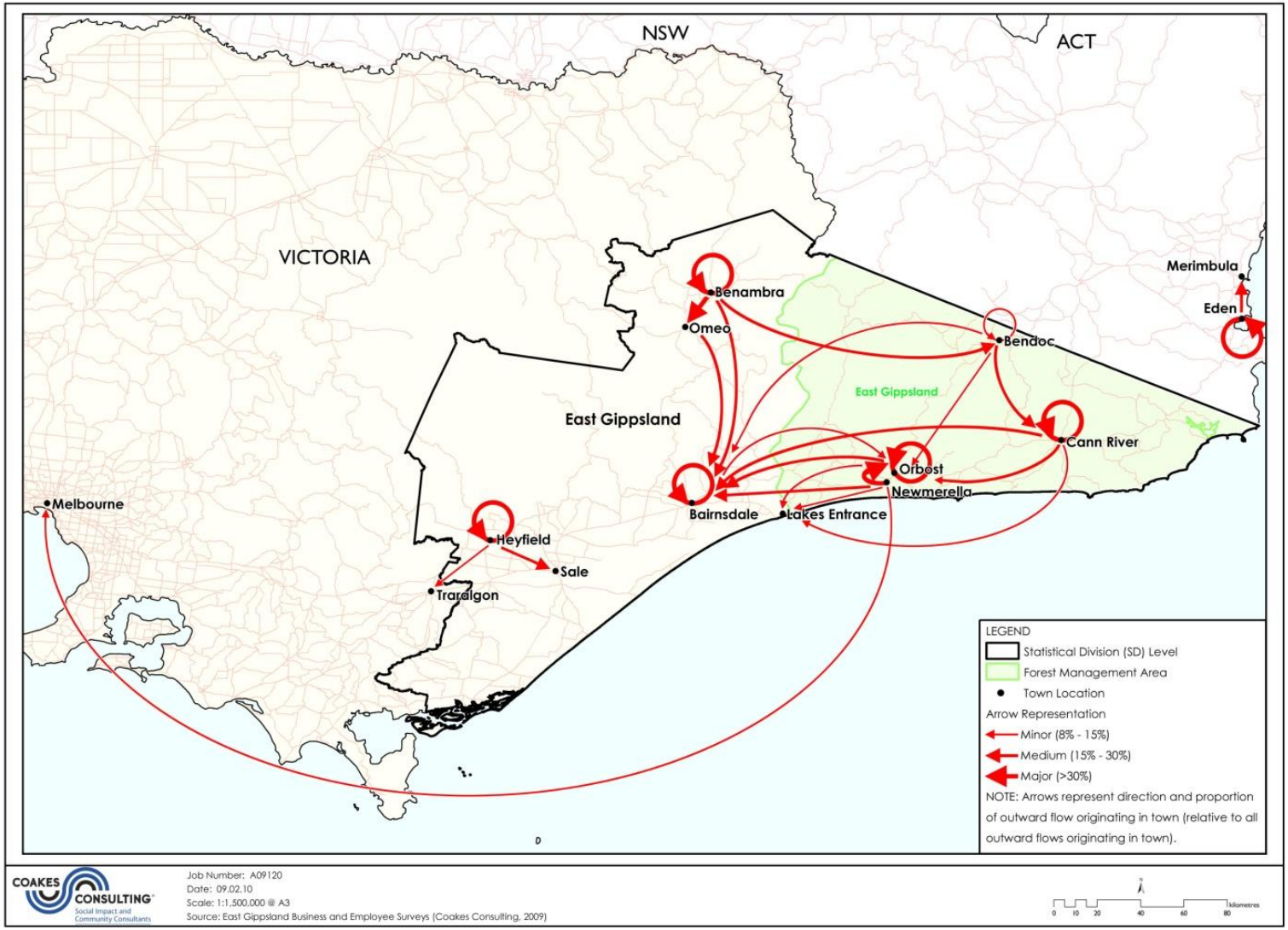


Figure 2.9: Example of output from social clusters analysis. Figure displays household expenditure flows in relation to location of employees that work in industries with a reliance on the East Gippsland Forest Management Area.

2.1.4.2 Community adaptive capacity analysis

Community adaptive capacity analysis (Coakes and Sadler, 2011) assesses adaptive capacity or resilience of communities or stakeholder groups, based on resilience frameworks (e.g. Sustainable Livelihoods framework; DFID, 1999). Community capacity, as defined by the Sustainable Livelihoods framework, is based on the concept of a community's sustainability and can be considered as a similar concept in essence as "economic sustainability and social well-being" as it is described in Target 12. The methodology for community adaptive capacity analysis is described in more detail in Section 5.1.2.

Community adaptive capacity analysis is a useful profiling and monitoring tool to track how communities change over time in relation to natural, financial, social, physical, and human capital assets. The analysis organises indicators into these capital areas and provides a numeric score for each capital. As such, it may be a useful way for CMAs to better understand communities and monitor economic sustainability and social wellbeing at a community level within their respective catchments. The method can also be applied at the social catchment level (using social clusters identified through the analysis). While the intention of Target 12 is not necessarily to measure the success of NRM against overall economic sustainability and social well-being of communities, community adaptive capacity analysis could be integrated into NRM decision making and monitoring because it is a useful way of comparing social clusters and/or communities, in order to prioritise areas for investment.

The approach for assessing community adaptive capacity is based on the sustainable livelihoods framework (DFID, 1999). According to the Sustainable Livelihoods Framework (DFID, 1999), a community's adaptive capacity is enhanced by its access to capital assets across five key areas, as shown in Figure 2.10: natural (e.g. land and natural resources), economic (e.g. financial resources), human (e.g. skills and experience), physical (e.g. infrastructure), and social (e.g. participation and cohesion within the community). The framework is based on the assumption that key community capitals are fundamental in determining the resilience of a community, and that the community's capacity to adapt to any changes in way of life is dependent on the status of its capitals. Therefore, assessing the status of a community's key capital areas should provide a sound indication of that community's overall resilience and adaptive capacity to change and consequently its associated level of economic sustainability and social wellbeing.

Such an approach is particularly useful as it not only allows an identification of the strengths and weaknesses of a community's capitals and assets, but it also enables the strategic implementation of policies to assist a community in managing its weaker capitals and further optimising its stronger capitals, thus enhancing capacity and enabling more effective adaptation to change.

In applying this approach to NRM, the analysis can be tailored to relevant issues when selecting indicators to assess each form of capital. For instance, the natural capital index could be geared to assess indicators relevant to specific resource conditions within a catchment. In this sense, the index can be tailored depending on whether it is being used to assess "general resilience" (capacity to adapt to change in general, which may include unknown changes in the future) or to assess "specific resilience (capacity to adapt to specific, known changes such as loss of access to, or changed condition of a particular resource).

Figure 2.10: Community capitals framework

Source: Coakes Consulting

The method for undertaking community adaptive capacity analysis is more fully described in Section 5.1.2. As a general overview, the method involves first selecting indicators for each capital area (e.g. unemployment rate for economic capital). The selection of indicators could be undertaken during CMA workshops or in consultation with key agency or community stakeholders. Next, data for those indicators is gathered, usually from secondary sources such as ABS, but primary objective data or subjective ratings against indicators can also be used. Several communities would typically be included in the analysis, so that communities can be compared across indicators. This allows for standardisation of indicators scores, so that indicator data can be aggregated to produce capital indices (e.g. a human capital index) and an overall adaptive capacity index (which adds together the five capital indices).

Example output for a community adaptive capacity analysis is presented in Figure 2.11. The analysis could enable comparisons of communities within a catchment, and their overall adaptive capacity scores could be aggregated at a catchment level to compare catchments. As discussed later in relation to monitoring and evaluation (Section 2.2.2.1), the community adaptive capacity index can be used to monitor economic sustainability and social well-being over time, drawing upon regularly collected data such as the ABS census.

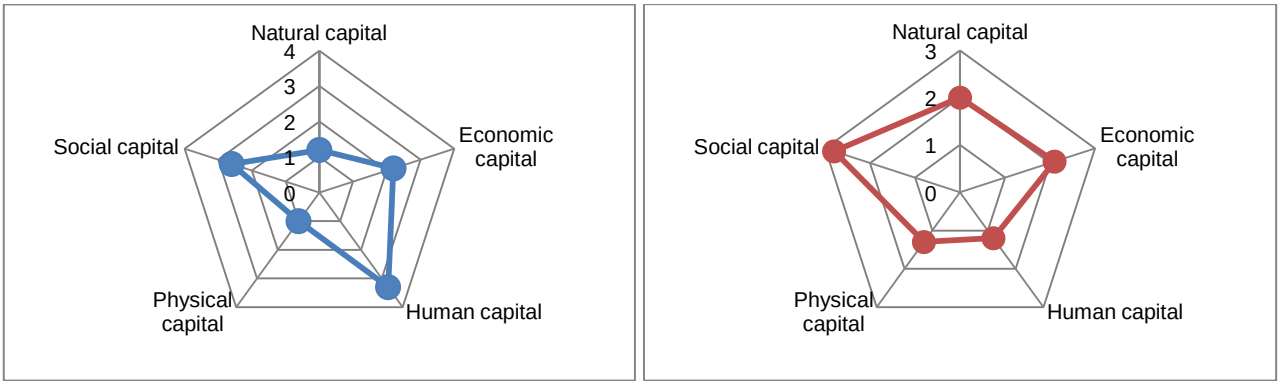


Figure 2.11. Comparing community adaptive capacities across multiple communities ("community A" in left hand panel, "community B" in right hand panel).

Source: Coakes Consulting

2.1.5 How can we understand what enables and constrains our stakeholders in participating in sustainable NRM?

This question relates to the assessment of natural resource managers' capacity (using the existing approach for assessing Target 13) to determine what prevents or enables key stakeholders to participate in sustainable NRM activities. There are multiple influences on the ability of farmers and other land managers to adopt sustainable farming practices (Jacobs et al., 2011). These factors may include the person's skills, experience, and competencies, their access to resources, and the institutional and policy environment in which they operate.

Assessing natural resource managers' capacity will help to inform the selection of appropriate NRM programs and identify where natural resource managers' capacity exists or is required to be further developed to effectively implement NRM initiatives. For example, an incentive program for farmers (e.g. to undertake activities on their property to counteract issues such as dry land salinity) may not be appropriate if the capacity assessment indicates they would not be likely to participate in the program due to constraints such as a lack of human resources.

Assessing natural resource managers' capacity is also useful for identifying opportunities for collective action, as it enables the identification of common goals between natural resources managers, CMAs, industry, and state and national governments, which can facilitate cooperation towards building aspects of capacity and reducing constraints to change NRM practices (e.g. institutional or policy constraints).

2.1.5.1 Natural resource manager capacity assessment

The existing method for assessing natural resource manager capacity in relation to Target 13 (see Jacobs et al., 2011) draws upon "rural livelihoods analysis" (Ellis, 2000) which is a variant of the sustainable livelihoods approach used in the method of community capacity analysis described above. As in the case of community adaptive capacity analysis, strength across the five capital areas is assumed to reflect adaptive capacity and resilience in a context of vulnerability and change.

The natural resource capacity assessment method already developed for Target 13 is distinct from the community adaptive capacity analysis due to the level at which it is applied. Whereas community capacity analysis is applied at the community or social catchment level and in relation to general resilience, the natural resource manager capacity is more specifically targeted at a single stakeholder group and in relation to a specific issue (i.e. their capacity to participate in the implementation of sustainable NRM activities).

The natural resource manager capacity assessment process involves consultation with key stakeholders to firstly identify indicators to measure elements of natural, human, social, physical, and financial capital, and then to secondly provide self-assessment ratings against each indicator. The approach typically brings together key natural resource managers to work through a 'self-assessment' process based on the five capitals. The workshop is a monitoring and evaluation process that enables regional- and State-level reporting on natural resource manager capacity, identifying gaps in capacity and the potential for development of capacity. The key steps in the workshop process, described by Jacobs et al. (2011), can be summarised as follows:

- identifying key natural resource managers to attend the workshop;
- explaining to participants the capitals framework and how it can be used to assess adaptive capacity;
- discussing and selecting an appropriate set of indicators for each area of capital, and developing a clear statement of the rationale for each indicator;
- self-assessment by natural resource managers in relation to each indicator;
- identifying common priorities for building adaptive capacity, and identifying practical strategies for collective action to do so (i.e. across the CMA, the wider community, industry, and governments);
- analysing and reporting results, and evaluating the approach.

The discussion during the workshop centres on identifying what enables and constrains sustainable NRM in a region (Jacobs et al. 2011).

This methodology also addresses what collective action should be taken to improve capital and this has proven to be useful in the past, as it has immediate input into how CMAs develop and construct their programs.

2.1.6 How do we prioritise relevant projects to address CAP priorities and capacity needs?

The question of how relevant projects should be prioritised is a complex one, as there is a wide range of issues that must be taken into consideration when evaluating proposals. The Investment Framework For Environmental Resources (INFFER), which has been applied by some CMAs (e.g. CWCMA, 2011), may be a useful tool for making decisions between alternative programs for improving resource condition, especially in a context of limited funding where it is important to prioritise investment options on the basis of different factors (such as the scale of the problem being addressed) in order to ensure the investments selected are those that will deliver the most value.

2.1.6.1 Investment Framework for Environmental Resources (INFFER)

INFFER is a tool for developing and prioritising projects designed to address environmental issues, and involves the following seven steps

1. Identifying significant assets – a large number of assets (approximately 100-300) are first identified
2. Filtering significant assets – assets reduced to 20-40 based on simple criteria, and then further reduced to 10-20 based on additional criteria
3. The Project Assessment Form – usually involves cost-benefit analysis, risk factors, key information gaps
4. Selection of priority projects – a short list is developed based on content of Project Assessment Forms and other relevant considerations
5. Investment plans or funding proposals

6. Implementing funded projects
7. Monitoring, evaluation, and adaptive management

2.2 Implementation (monitoring & evaluation)

The tools and methods discussed above were presented as ways to address key questions in relation to NRM *planning*. The following sections relate to monitoring and evaluating the effectiveness of NRM investments, which is a critical aspect of NRM *implementation*.

Targets 12 and 13 encourage CMAs to evaluate the effectiveness of NRM initiatives in (a) maintaining economic sustainability and social well-being within the catchment (Target 12), and (b) building the capacity of natural resource managers to participate in sustainable NRM activities (Target 13). Monitoring and evaluating progress towards these targets may be very challenging for CMAs, given that it can be difficult to attribute change in a particular outcome (e.g. economic sustainability and social well-being) to a specific NRM initiative, when many other factors can influence that outcome (e.g. global economy, climate).

In this section, three key questions are posed for CMAs to consider, along with potential tools and frameworks for exploring them. These questions are:

- How do we monitor and evaluate the social return on investment of NRM programs?
- How do we monitor and evaluate economic sustainability and social well-being at the community level?
- How do we monitor and evaluate adaptive capacity of land holders/ natural resource managers?

The first two questions relate to Target 12, while the third question relates to Target 13. The first two questions may assist CMAs in thinking about how to approach monitoring Target 12 in a practical manner. The first question, relating to social return on investment of NRM programs, is concerned specifically with outcomes that can be attributed to the program being evaluated. The second question, relating to economic sustainability and social well-being, is more general and community focussed, and can be monitored over time to track changes in overall community capacity (without necessarily attributing all of these changes back to a specific program). In combination, answers to these questions may shed some light on the overall role of NRM in maintaining economic sustainability and social well-being at a catchment level.

These questions and suggested tools for exploring them are discussed in more detail in the sections to follow.

2.2.1 How do we monitor and evaluate the outcomes of NRM programs?

Evaluating programs to determine their outcomes and establish their return on investment is an important part of NRM implementation (and will also assist future planning).This is particularly the case when resources are limited and must be well spent on programs that will deliver the most value.

There are a range of program evaluation tools and frameworks available that can assist CMAs. These tools and frameworks vary in their complexity and scientific robustness, and the selection of the right method will usually need to consider a number of factors, including (a) what resources are available to conduct the evaluation, and (b) what type of outcomes data is actually required.

In some cases, it may be sufficient to conduct a basic program evaluation consisting of stakeholder interviews, in which program outcomes are understood via qualitative research and analysis with affected parties. However, there may be cases where outcomes resulting from a program need to be measured and quantified both accurately and reliably. Undertaking an evaluation of this kind can be very challenging, particularly in situations where controlled studies cannot be undertaken (e.g. clinical trials) and it becomes difficult to attribute an outcome to an intervention (i.e. in the real world). Social return on investment (SROI) analysis may be a useful method for CMAs to explore as a way of measuring outcomes of NRM investments, particularly because it attempts to deal with the problem of attribution.

2.2.1.1 Social Return on Investment (SROI) analysis

Social return on investment (SROI) analysis is an established framework for measuring social outcomes associated with an investment and translating these outcomes into their financial value. The SROI methodology is described more fully in Section 5.1.3. In short, the methodology is a framework for measuring change, estimating the value of social outcomes, and comparing the value created to the investment made in order to produce a social return on investment ratio. As such, SROI can serve as a useful tool for making better informed NRM investment decisions and understanding the impact of NRM programs on economic sustainability and social well-being. Furthermore, SROI analysis can be based on a forecast of predicted outcomes, or an evaluation of an existing program's outcomes.

As noted, the SROI framework is particularly useful because it attempts to address challenges associated with social outcomes measurement, such as the "attribution problem" (determining the extent to which programs can be credited for an outcome) and other concepts such as "deadweight" and "displacement". Furthermore, by converting program benefits into a common language (dollars), SROI analysis enables comparisons between investments in a way that is easy for managers to understand (particularly if they are familiar with financial measures such as "return on investment" or ROI).

In its favour, SROI analysis is a robust method for undertaking program evaluations and there are many resources available such as guidance papers and training programs that may be of use to CMAs. However, a comprehensive SROI analysis tends to have onerous data sourcing requirements and typically demands a level of competence from the analyst in areas such as quantitative research methods, economics, and social science. Nevertheless, SROI analysis can be applied at different levels of comprehensiveness and complexity, and can therefore offer value as a way of thinking about program evaluation even if not all of its components are adopted.

SROI analysis is discussed in depth in section 5.1.3, with more information about strengths and limitations, plus some worked examples.

2.2.2 How do we monitor and evaluate economic sustainability and social well-being at the community level?

Target 12 states that NRM decisions should contribute to improving or maintaining economic sustainability and social well-being. In order to monitor performance towards this target, CMAs may find it useful to monitor economic sustainability and social well-being at the community level (i.e. communities or groups within the catchment) over time. While doing so would not on its own allow for any conclusions that an NRM decision was the reason for any observed changes in economic sustainability and social well-being at the community level, the results could be interpreted in the context of program evaluations for specific initiatives (described above in Section 2.2.1) to enable some inferences to be made about the role of NRM.

2.2.2.1 Community adaptive capacity analysis

Communities within a catchment can be monitored in relation to their economic sustainability and social well-being on an ongoing basis (e.g. every five years using Census data, or over shorter time-periods using primary data collected through consultation) using the method of assessing community adaptive capacity described in Section 2.1.4.2 and in more detail in the Appendix. Figure 2.12 presents an example of how such data could be presented to monitor long-term socio-economic trends.

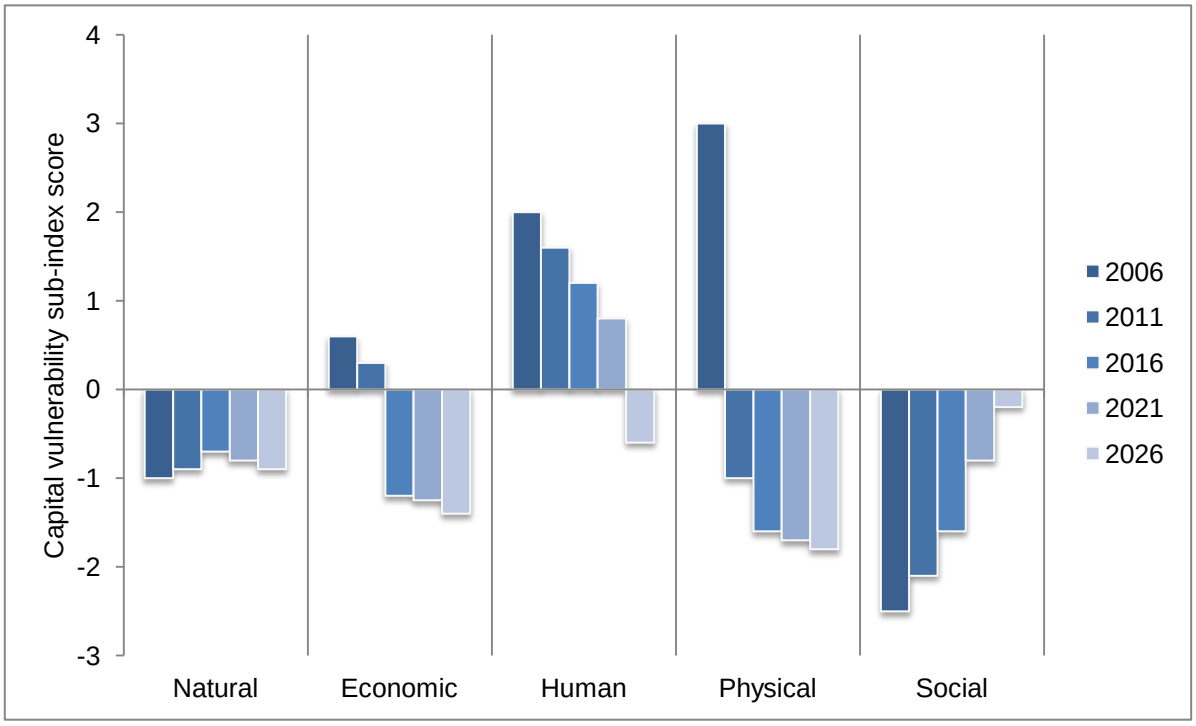


Figure 2.12: Tracking a community's economic sustainability and social well-being over time, using community adaptive capacity analysis.

In combination with program-level assessments of NRM's contribution to economic sustainability and social well-being, monitoring this concept at a community level will ensure community well-being is tracked over time to provide context for understanding NRM program-related social change within a catchment.

The results of the community adaptive capacity analysis can also provide insight as to whether or not economic sustainability and social well-being is being maintained over time (which is the ultimate objective of Target 12), although community change will not necessarily be attributable to NRM activities due to the range of factors that contribute to community resilience.

2.2.3 How do we monitor and evaluate adaptive capacity of land holders/ natural resource managers?

Target 13 encourages CMAs to work towards improving the capacity of natural resource managers to contribute to regionally relevant natural resource management. CMAs may wish to track and report on how the capacity of natural resource managers has changed over time, in order to measure progress against this target.

2.2.3.1 Natural resource manager capacity assessment

As discussed in Section 2.1.5, one of the key questions CMAs may be interested during the planning stage relates to the extent to which natural resource managers have the capacity to implement or participate in NRM initiatives. For that question, it was suggested that the existing framework for assessing natural resource manager capacity (Jacobs et al., 2011) was appropriate for understanding what enables or constrains natural resource managers in participating in such activities.

However, while in planning it is sufficient to undertake this assessment just once – to inform decision making on the basis of current natural resource manager capacity – monitoring performance against Target 13 requires an assessment of natural resource manager capacity on an ongoing basis. Therefore, the existing framework (Jacobs et al., 2011) can be drawn upon here as well, whereby the assessment can be undertaken at regular intervals and changes in capacity can be monitored over time.

2.3 SUMMARY

This section has provided a high-level overview of how social assessment tools can help CMAs to address key questions that arise during NRM planning, decision making, and monitoring. Further information is provided in the Appendix providing on the proposed tools for monitoring and evaluating NRM outcomes as they relate specifically to Targets 12. These discussions also provide some worked examples of how the methods can be applied in practice.

Table 2-2 below provides some guidance as to the expected data and resourcing requirements of each method. In addition, the Appendix contains a detailed table (Table 5-6) containing a summary of practical guidelines and resources that are available in relation to social impact assessment more generally, which may be of use to CMAs in addition to the specific tools and frameworks discussed above.

Table 2-2: Requirements in relation to resources and skills and competencies for the application of socio-economic tools and frameworks.

Tools and frameworks	Resources and data sourcing requirements	Skills and competencies required (i.e. social sciences and quantitative methods ONLY)
• Stakeholder identification and analysis	**LOW** (desktop research)	**LOW**
• Values mapping	**HIGH** (primary data collection)	**LOW**
• Social networks analysis	**LOW** (desktop research)	**LOW**
• Influence diagrams	**LOW** (desktop research)	**LOW**
• Social clusters analysis	**HIGH** (primary collection data required)	**HIGH**
• Community capacity assessment	**MEDIUM** (primary collection data optional)	**HIGH**
• Natural resource manager capacity assessment	**MEDIUM** (primary collection data optional)	**MEDIUM**
• Investment Framework for Environmental Resources (INFFER)	**MEDIUM** (primary collection data optional)	**LOW**

• Social Return on Investment (SROI) analysis	**HIGH** (primary collection data required)	**HIGH**

3.0 Suggested next steps

As noted in the introduction, this paper is intended to provide practical guidance and suggestions to CMAs around socio-economic assessment methods that are available. Some of these tools might be appropriate for further investigation by individual CMAs in relation to how they might be integrated into NRM planning and implementation processes.

Some suggested next steps for CMAs include the following:

- Review current use of socio-economic assessment methods and identify opportunities for development, and / or opportunities for the introduction of new tools to address gaps;
- Examine how tools may be tailored for specific purposes of the CMA;
- Identify which of the key questions presented in this report may be most relevant to the CMA and consider undertaking a trial of the relevant socio-economic assessment methodologies to address those questions;
- Share learning among CMAs in relation to (a) socio-economic assessment methods that have worked well, and (b) opportunities for improving upon previous attempts to utilise socio-economic assessment methods.

Further information and support can be provided to CMAs that are interested in any of the tools and frameworks presented in this report.

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5.0 APPENDICES

5.1 APPENDIX A – DISCUSSION OF METHODOLOGIES

The following section describes in more detail three core methodological approaches discussed in Section 2.0 of the main report. These methods are

- Social clusters analysis – for identifying and quantifying socio-economic linkages between natural and human systems.
- Community adaptive capacity analysis – for profiling communities and understanding their resilience across key capitals (economic, human, social, physical, and natural capital).
- Social return on investment (SROI) analysis – for assessing social outcomes associated with investments or programs and estimating their value.

5.1.1 Social clusters analysis

This section provides an overview of social clusters analysis, based on a conceptual framework known as Town Resource Cluster Analysis (TRC-Analysis) that has been developed in Australia for undertaking social impact assessment (SIA) within a natural resource management (NRM) and planning context. The approach, first developed by Dr Mark Fenton and Dr Sheridan Coakes for the Australian RFA social assessment process, provides an important framework for understanding the linkages between natural and social systems.

As outlined in Fenton, Coakes and Marshall (2003), the approach is based on the premise that there are two systems that are critical components of any approach to SIA within NRM and planning:

1. Resource systems – which are defined with reference to satisfying human needs and in terms of their utility value to social systems; and

2. Social systems – that may be characterised in terms of a number of underlying qualities, that include biophysical, health, cultural, social, political/legal, economic and psychological components (Gramling and Freudenburg, 1992). Within an NRM context, these underlying qualities include property rights, land and resource tenure systems, systems of knowledge relevant to environment and resources and world views and ethics concerning environment and resources (Berkes and Folke, 2000). As Slootweg et al (2001) outline many of these systems and subsystems interact and are not independent.

Literature in the area (Berkes and Folke, 2000; Conacher and Conacher, 2000) has outlined that while many previous studies have analysed the impact of human activities on the ecosystem, few have studied the interdependence of social and ecological systems to afford a greater understanding of the linkages between the resource system and environments generally.

Prior to the development of social clusters analysis, the implementation of social impact assessment generally, and more specifically the assessment of social and community impacts of changes in resource use and management, was broadly based, fragmented and lacked an organising framework, on which to effectively examine more locally based social and community impacts. Even questions of defining what constitutes a community, and what are the appropriate social units of analysis in social impact assessment, has been long debated by social researchers and practitioners.

Consequently, one of the primary objectives of social clusters analysis is to define meaningful spatial units – social clusters – on which to base SIA processes. Many units used by NRM agencies are clearly defined on the basis of ecological criteria and NRM characteristics, but there have been no corresponding units associated with the social environment.

In the absence of more meaningful social units, as Machlis and Force (1998) and Machlis et al (1990) outline, 'community' has often been defined in terms of a town, county, local government area and/or region, depending on the context and data available. However when considering communities that may be dependent upon particular natural resources, it may be more appropriate to understand communities in relation to a hierarchical or nested concept (Machlis and Force, 1988 and Beckley, 1998) – an approach similar to central place theory (Christaller, 1933) which acknowledges in a regional context, a network of central places/towns that exist in relation to trade areas and the supply and consumption of goods and services.

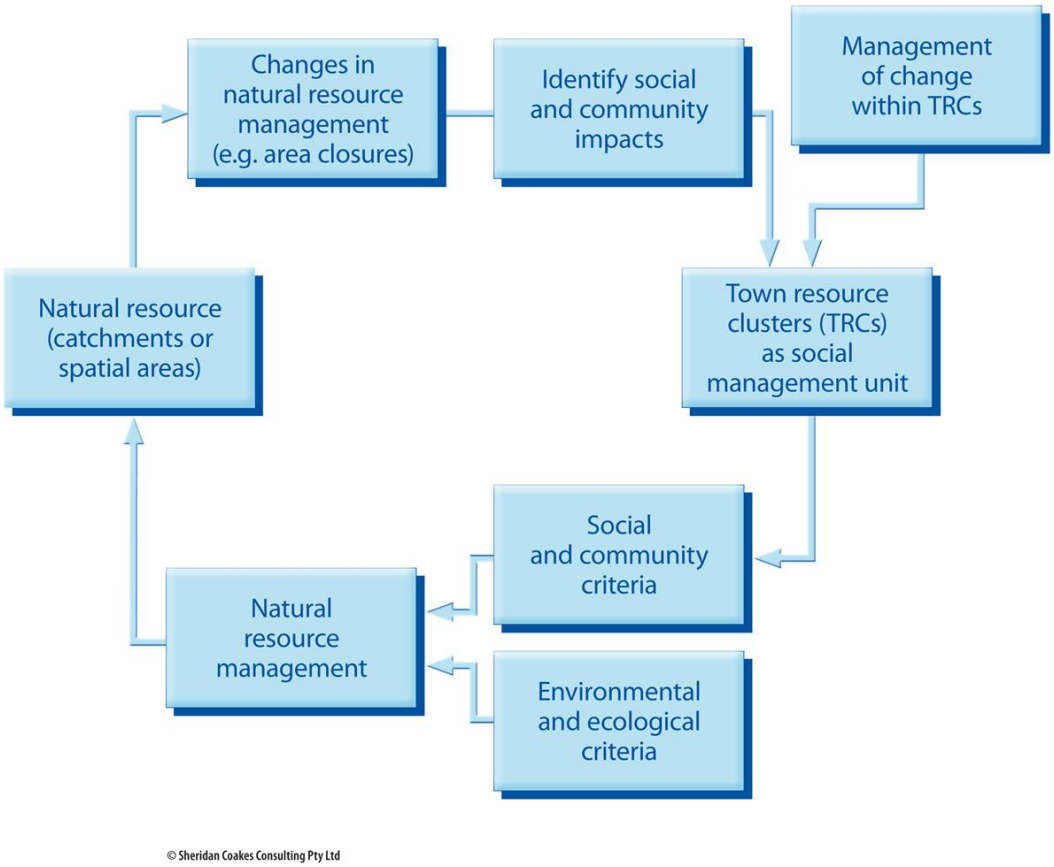
Studies that adopted this type of approach (Cramer et al, 1993; Mayfield, 1996) recognise the mutual independence of individuals, communities and townships. For example the Mayfield study reported significant microeconomic and financial interdependencies among farming communities in a regional context. Therefore, a framework that provides an understanding of these interdependencies and the linkages to a natural resource may provide a more appropriate theoretical and conceptual rationale for defining community (Fenton, Coakes and Marshall, 2003).

Therefore in summary, social clusters analysis has two core objectives:

1. To develop meaningful spatial units (social clusters) on which to ground social impact and assessment processes. These units are usually classified on the basis of specific ecological and resource management characteristics, however there is no corresponding unit associated with the social environment.

2. To establish a relationship between the use of the natural resources and specific communities (social clusters). Such a relationship allows an understanding of the potential social impacts likely to be experienced by communities and townships as a result of changes in the management and use of natural resources.

Figure 5.1 summarises the conceptual linkage between a relevant natural resource management unit and a socially defined TRC. The figure illustrates how social and community criteria derived from social assessment processes within a TRC can be used concurrently with environmental and ecological criteria to better identify and inform the management of natural resources.



Source: Fenton, Coakes and Marshall (2003)

Figure 5.1: A model for the integration of social and ecological systems

A key component of social clusters analysis involves identifying the dependency and or associations that exist between human or social activities and a natural resource area or unit. For example, it is often the case that communities will have an economic or subsistence dependency on a natural resource through activities of resource extraction (i.e. mining, timber harvesting, and agriculture) or direct use (i.e. recreation, leisure, tourism).

For example, in Cramer et al's (1993) study it was emphasised that, in the context of timber production and natural resource dependency generally, changes in resource availability resulted in a chain reaction 'affecting not only loggers and mill workers, but businesses, social services and people not generally involved in timber production'. These broader indirect effects were seen to not only occur in the town in which primary production and resource processing exists, but also in other towns / communities located in the same trade areas and areas of social service provision.

Resource dependency indicates that a relationship exists between social and resource systems, in that the maintenance of a social system(s) may be reliant on one or more resource systems. Much previous research undertaken in the context of resource-dependent communities has adopted a similar definition (Randall and Ironside, 1996; Beckley and Sprenger, 1995) but has utilised simple one-dimensional economic measures, such as the level of employment in the resource sector.

Others however have argued for a broader multi-dimensional definition (Machlis and Force, 1998; Overdevest and Green, 1995; Beckley, 1998 and Adger, 2000). In this vein, it is important to recognise that many communities may also have an association with a natural resource, such as

historical or broader cultural association, rather than just a direct economic dependency on a resource.

5.1.1.1 Defining social clusters

Linkages between natural and human systems can be established using social clusters analysis through consultation with key stakeholders, in order to collect data to quantify resource use or dependence (direct or indirect).

For example, natural resource-dependent activities (e.g. fishing, agriculture, and tourism), whether located within rural areas or within specific townships are linked to other industries and towns within a region. Research suggests that many communities within a region will be 'mutually dependent', where a change in resource -dependent industry activity in one town will often significantly affect other towns in the region. The linkages between the resource dependent industries in one town may potentially impact on other towns through the following linkages or dependencies between communities or stakeholder groups:

- Industry / business location;
- Industry expenditure on goods and services;
- Employee towns of residence;
- Employee household expenditure; and
- Employee use of social infrastructure services and facilities.

The cluster of identifiable and interdependent communities or stakeholder groups, referred to as the social catchment, provides the basic framework for understanding the social and micro-economic impacts of changes in resource access or status. The social catchment represents a cluster of communities or stakeholder groups, which is a meaningful unit for the purpose of understanding the potential social impacts of changes in resource management and use and are thus more meaningful in informing an assessment of social impacts.

Without the application of social clusters analysis, such assessments are usually based on available data and defined or derived social boundaries e.g. local government areas, urban centres, etc. While data collected by agencies such as the Australian Bureau Statistics is useful information in informing social assessment programs, the definition of more clearly defined units of analysis that relate directly to the particular resource area, enables more accurate prediction of social and economic impacts on communities and the regions in which they are based.

While the linkages and inter-dependencies among towns within a social catchment may be identified and described, the informative aspect of the approach is the ability through spatial network and catchment analysis to examine the type, probability and magnitude of social and micro-economic impacts on specific communities or stakeholder groups within social clusters.

5.1.2 Community adaptive capacity analysis

The following section describes the theoretical framework underlying community adaptive capacity analysis, and the methods for selecting and analysing indicators to produce a composite index of community adaptive capacity.

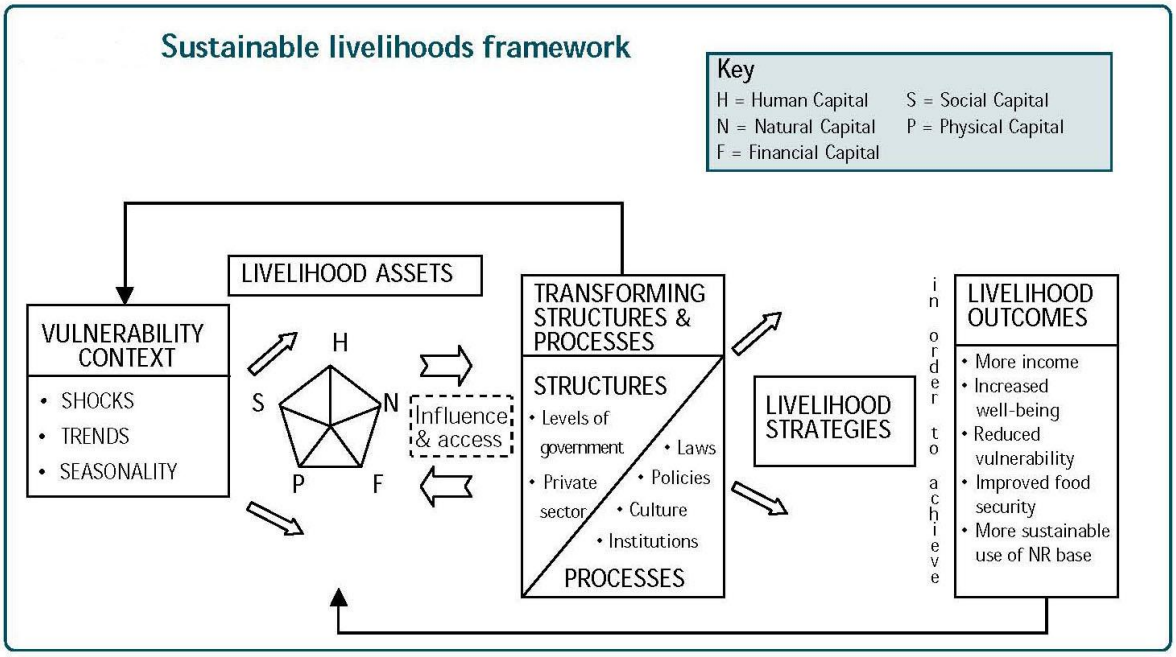
5.1.2.1 Theoretical framework

There has been considerable research to consider what makes a community strong and resilient to change. For example, Carina and Keskitalo (2008, p.219) define vulnerability as "the degree to which a socio-economic and environmental system is likely to experience harm due to exposure to a risk, hazard, or changing conditions". They suggest that vulnerability is a result of how sensitive a system is to change and how effectively the system can respond or act to reduce this effect. The

potential of a system to adjust to and thereby limit risk is usually referred to as its resilience and adaptive capacity.

An integrated community resilience framework should not only identify those key community assets which are imperative to ensuring community resilience over time, but the framework should also address how community capacity can be enhanced to enable the community to manage its key capitals and assets better, so that robust adaptive capacities may be developed against sudden shocks, changes, or threats to community way of life. According to Hart (1999), natural, human, social, and built capitals are the key assets to defining community resilience and sustainability over time. Hart stresses the importance of optimising the community's utilization of its key capitals. Also central to Hart's model is the inter-relationship and linkages across different community capitals and assets, such that where one capital is depleted, other community capitals and assets are also likely to be correspondingly compromised. For example, should human capital be depleted, in terms of a potential deterioration in levels of education or health, the subsequent maintenance of built capitals (e.g., economic infrastructure) are likely to also become affected, thus compromising the overall sustainability of the community.

The United Kingdom Department for International Development's sustainable livelihoods approach also draws upon the broad categories of community capitals identified above as a fundamental basis to identifying and further enhancing community capacity and resilience. DFID (1999) consider that a livelihood includes the capabilities, assets (including material and social resources) and activities required for people to meet their basic needs and support their wellbeing. A livelihood is considered sustainable "when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base" (DFID 1999, cover).



Source: DFID (1999), used with permission

Figure 5.2. Sustainable livelihoods framework.

Figure 5.2 outlines the sustainable livelihoods framework, illustrating the status of key community assets and capitals in determining community sustainability and resilience against potential risks and significant changes. The approach is predicated on the understanding that people seek to maintain their livelihood within a context of vulnerability. Threats to their livelihood include shocks

(such as sudden onsets of natural disasters, health problems, conflicts, and economic crises), trends (for instance, those relating to the economy, health, resources, and governance) and seasonality (such as cyclical fluctuations in prices or employment).

The assets discussed in the sustainable livelihoods framework are very similar to Hart's (1999) capitals, but include an additional form of capital, financial capital. While there is an uneven distribution of capital assets across individuals and communities, those with a stronger and more diversified portfolio of assets are likely to have more livelihood options and should therefore prove more resilient in response to change.

As depicted in Figure 5.2, structures refer to the roles or levels of government and the private sector in influencing livelihoods; while processes refer to the laws, policies, culture, and institutions that govern the way structures, individuals, and communities operate and interact. Transforming structures and processes shape livelihood strategies – the way individuals mobilise their assets to achieve their goals – and consequently the returns (economic or otherwise) of those strategies. These returns would ideally contribute to the further strengthening of capital assets within the community. By identifying the key role of a community's various capital assets in shaping its capacity to cope with and adapt to change, the sustainable livelihoods approach provides a useful starting point for developing a way in which to assess a community's adaptive capacity. The concepts of community resilience and capacity development can also be adapted and applied to specific interest groups within more focused contexts. Ellis (2000) and Jacobs et al. (2011), for example, have applied the approach to consider the capacity of rural landholders and land managers to adopt new land management practices (which is the existing approach for assessing Target 13).

Assessing whether a community (or a specific interest group or sector) will be resilient or vulnerable to specific changes or risks involves an initial identification of the current status of that community's (or group's) key assets and capitals. The result is a quantifiable baseline degree of adaptive capacity. Following this baseline assessment, appropriate intervention strategies and policies may be subsequently implemented and targeted to optimise and enhance overall capacities to manage key assets and capitals, thus warranting more effective adaptation to change.

5.1.2.2 Indicator selection and analysis

In quantifying community sensitivity, a community's adaptive capacity across its key capitals is assessed using a unique suite of socio-economic indicators specific to each capital area, and which may be further developed and refined to more specifically relate to particular changes.

The following table provides an example of some indicators and related variables that Coakes Consulting have used to assess the status of individual community capitals. These indicators have predominantly been informed by secondary data sources such as the Australian Bureau of Statistics (ABS) Census data. However, in the absence of appropriate secondary data, subjective stakeholder ratings can be obtained against relevant indicators (as in the method being used to assess Target 13).

Table 5-1: Example Indicators for Assessing Community Sensitivity

Capital	Headline Indicator	Example Variables
Natural Capital Accessibility to, and dependency on, land and natural resources.	Resource Dependency	Proximity to natural resources e.g., minerals / oil and gas
Economic Capital Extent of financial or economic resources within a given town or community	Household Socio-economic Status	Home Ownership
		Income Levels
		Employment Status
	Local economic activities	Economic / Industrial Diversity
Physical Capital Community accessibility to social infrastructure and service provisions, including information accessibility	Service Accessibility	Accessibility to Child Care Services
		Accessibility to Primary and Secondary Education
		Accessibility to Aged Care Services
		Community Health Centre
	Information Accessibility	Internet Access
		Accessibility to Public Library Services
Human Capital Health and welfare of community residents, including their knowledge, skills, and overall capacities to contribute to ongoing community sustainability and to maintain resilience to changes and potential risks	Education	Post-school Qualifications
		School Completion
		School attendance
	Skills and Expertise	Low Skilled Occupations
	At-Risk Groups	Minority / Vulnerability Groups
Social Capital Dynamics and strength of relations and / or interactions within a given community	Civic Participation	Participation in not-for-profit voluntary organisations
		Voting participation in Local Govt elections
	Sense of Community	Religious Beliefs

Source: Coakes Consulting (2009)

The index of community adaptive capacity can be tailored to suit specific requirements of CMAs. For instance, in previous applications the index has been geared towards measuring community adaptive capacity to changes occurring in specific industries (such as mining and forestry). This was achieved by including indicators such as an employment diversity index as an measure of economic capital. As such, the community adaptive capacity index could be refined by CMAs to include indicators relevant to specific issues.

To obtain a quantifiable index of community adaptive capacity, variable scores for all the indicators across each capital area are standardised to produce a sub-index of adaptive capacity for each capital. These sub-indices are then aggregated for individual towns and communities to obtain a composite community adaptive capacity index (see Figure 5.3).

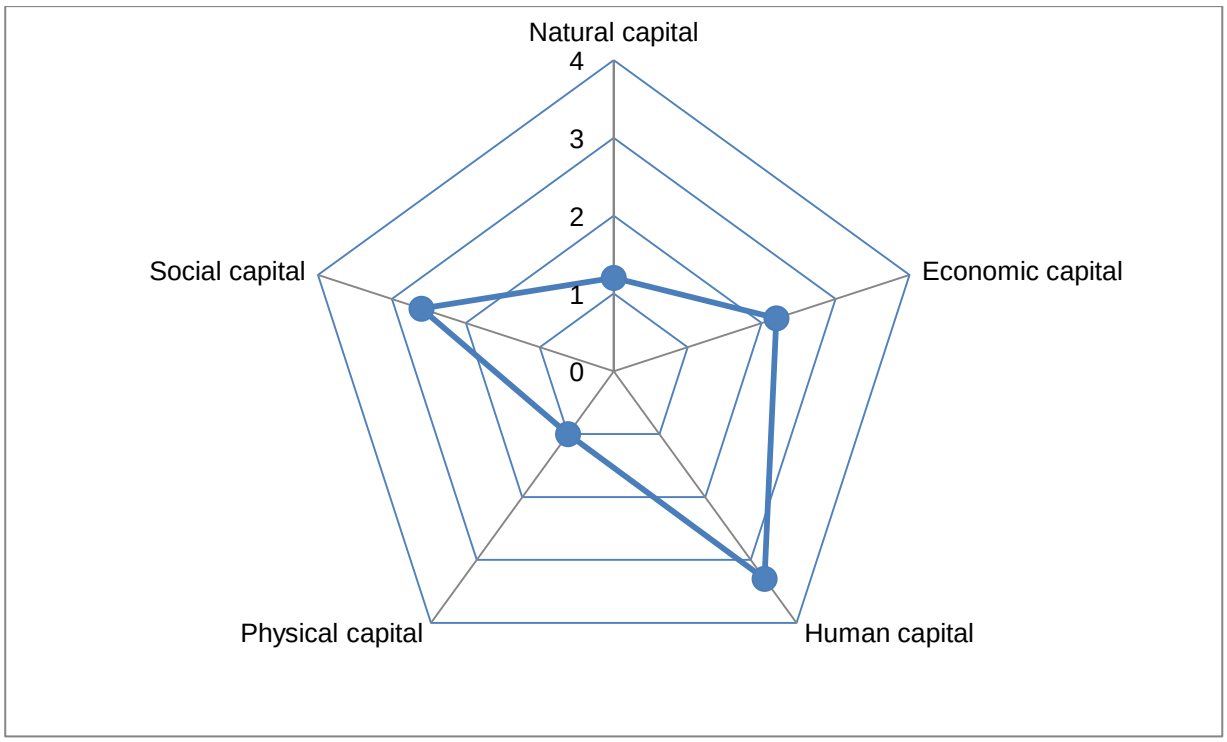


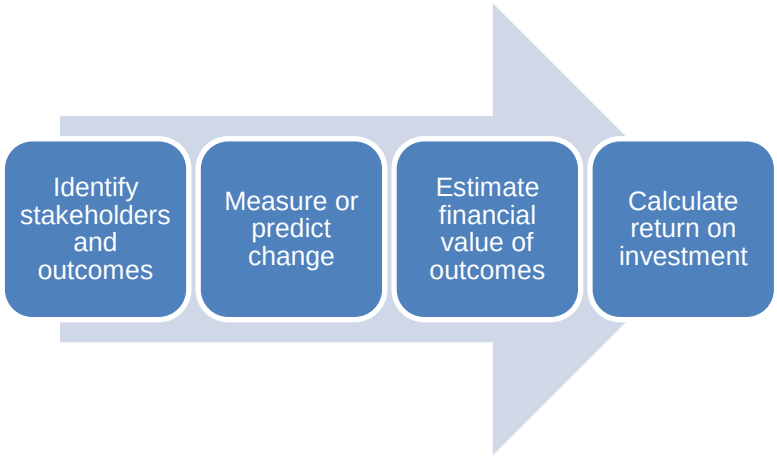
Figure 5.3: Example output from adaptive capacity analysis

5.1.3 Social return on investment (SROI) analysis

5.1.3.1 Overview

Social Return on Investment (SROI) analysis is useful for determining the value created by a program, particularly when the outcomes of the program are social or environmental in nature and not typically considered in terms of their financial value. In this sense, the framework can be usefully applied to NRM investments or decisions where such actions are expected to yield outcomes that relate to community sustainability and well-being. The SROI method can be applied either *ex ante* (forecast) or *ex post* (evaluation).

Broadly speaking, the methodology provides a framework for identifying stakeholders and potential outcomes, measuring change, estimating the value of outcomes, and comparing the value created to the investment made, in order to produce a SROI ratio. These stages occur in sequence, where each step is a logical prerequisite of the next step (as shown in Figure 5.4).



Note: Some steps such as estimating financial value and calculating the SROI can be considered optional if it is sufficient to simply measure outcomes

Figure 5.4: Overview of key stages of an SROI analysis

The SROI framework is unique because it seeks to quantify and value non-financial outcomes. However, these later steps of an SROI analysis are challenging and often require considerable skills and resources. Implementing these steps, therefore, will depend on the availability of skills and resources within individual CMAs. However, the output of these steps – the quantification and valuation of outcomes – may not always be necessary or helpful. For instance, for a low cost investment where outcomes are relatively certain, it may be sufficient for the purposes of Target 12 to simply identify stakeholders and the likely (forecast) or perceived (evaluation) outcomes through a process of stakeholder consultation, without taking the next steps of measuring and quantifying those outcomes and assigning a financial value to them. Similarly, in some instances it may be important to measure or quantify outcomes in order to verify that change has occurred, but the final steps of valuing those outcomes and calculating the SROI ratio may not be necessary.

Therefore, the SROI framework can be utilised to varying degrees depending on specific needs of individual CMAs and the nature of their NRM decisions or investments. As noted, it is the valuation of outcomes that is unique to SROI, and therefore an analysis should only be considered “an SROI analysis” if this step of outcome valuation is performed. However, the SROI framework does provide a very useful and robust (though, not unique) method for understanding and measuring change. As such, an understanding of the SROI framework and how it is applied in full could prove useful for CMAs even if it is not necessarily a requirement for CMAs to estimate financial values of the outcomes of all investments and decisions.

The following section provides more detail around key steps of an SROI analysis. This will be followed by a worked example (using a real NRM investment).

5.1.3.2 Key steps

The following list provides an overview of key steps in an SROI analysis, which is somewhat more detailed than the higher-level overview of stages represented above in Figure 5.4.

1. Identification of key stakeholders
2. Developing the theory of change (mapping the relationships between inputs, activities, outputs, and outcomes)
3. Identification of indicators
4. Collection of data
5. Valuing the outcomes (using financial proxies)
6. Analysis of income and expenditure
7. Calculation of social return
8. Reporting and monitoring

Following identification of key stakeholders, an important step in conducting an SROI analysis is to develop a theory of change, which is sometimes referred to as a map of "social value creation" or "impact map" that consists of inputs, activities, outputs, and outcomes for each stakeholder group. Inputs and activities include the money and time (e.g. labour) invested in the initiative, whereas outputs refer to what happens as a result (e.g. "20 people attended the training course"). Outcomes depend on the effectiveness of the outputs and refer to what benefits are actually created (e.g. "75 percent of training course participants were assessed as having achieved competence in relation to the content of the training"). Developing the impact map draws upon logical consideration of how inputs and activities lead to outputs, which in turn produce outcomes for different stakeholder groups (see Figure 5.5). Though not a requirement, mapping outcomes is best achieved through consultation with key stakeholders as this will provide an understanding of how value is created by a program or investment. Interviews or focus groups are best suited to this aspect of an SROI analysis, because they can be exploratory in nature and allow for in-depth discussion.

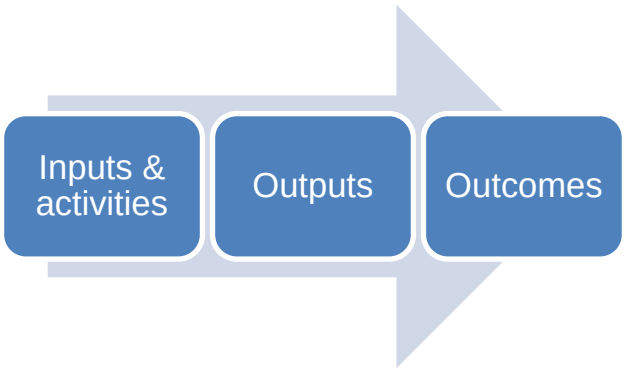


Figure 5.5. Mapping outcomes.

The next step is to establish the actual role of the program in the achievement of the outcome. For instance, an observed change in an outcome may not necessarily be a result of the program's output, when other factors are considered.

Therefore, the step of "establishing impact" in SROI analysis involves a consideration of the following concepts

- Attribution – how much credit can the program claim for the outcome, considering there may be other contributing factors?
- Deadweight – to what extent is the observed change different from what would have occurred anyway (i.e. if the program did not exist)?
- Displacement – has the outcome resulted in any net change, or has it simply moved a problem elsewhere? For example, has a program designed to reduce crime simply shifted crime from one area to another?
- Drop off (outcome drop off and attribution drop off) – how long does the outcome last (outcome drop off), and for how long can the program claim credit for the outcome (attribution drop off)?

These concepts usually present the greatest challenges for measuring social change resulting from a program or investment. The NRC recognises the challenges of measuring change in relation to Target 12, and in particular has acknowledged the "attribution problem" – specifically, that it is difficult to attribute changes in economic sustainability and social well-being to NRM decisions when many more significant external factors are involved (e.g. global markets, drought; see Gale, 2010, for a discussion). A key strength of the SROI framework is that it recognises these challenges and offers ways to address each of the above concepts. For instance, attribution can be addressed in a number of ways, using both objective and subjective assessments. For example, the principles of the before-after / control-impact (BACI) approach often adopted in ecological

studies can also be applied to outcomes affecting people. This approach is essentially the same as those used to assess the effectiveness of treatment interventions affecting people (e.g. medical or psychological studies). Following these types of approaches, change in a particular outcome indicator is measured over a period of time, in both a treatment site / group and a control site / group, while all other factors are held constant (see Figure 5.6). If a treatment site / group experiences greater change than the control site / group, then the effect can be attributed to the treatment.

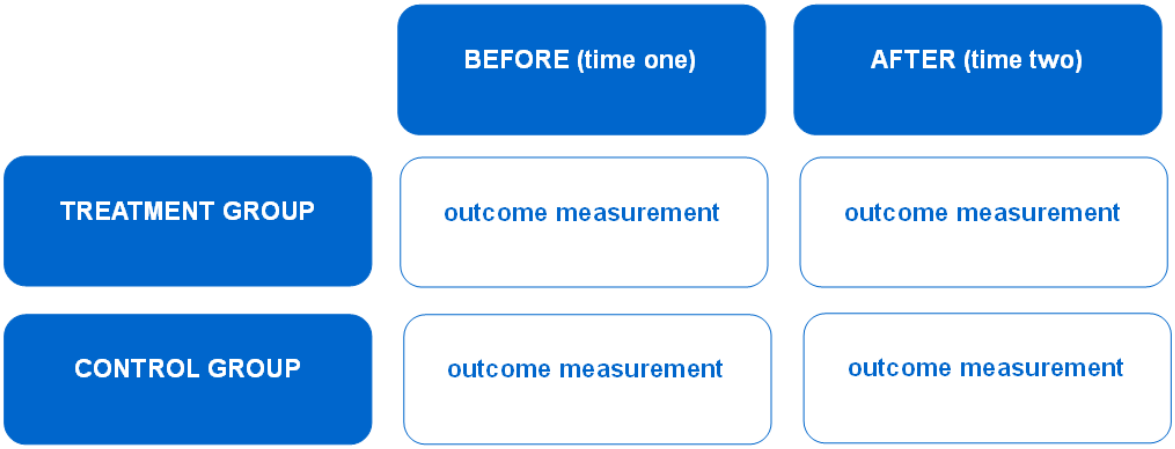


Figure 5.6. Experimental design for measuring change resulting from an intervention.

This type of approach for measuring change can be readily applied to assess changes in social outcomes (e.g. increases in social interaction or recreational activity as a result of an NRM decision) using questionnaires or other consultation techniques, designed to measure changes in stakeholders' attitudes and behaviours as they relate to the outcome being assessed. However, it is recognised that this approach is resource-intensive, given it requires a particular skill set (e.g. research design and analysis) and considerable time and resources (to measure changes over multiple points in time, which is especially problematic if changes in outcomes are expected to occur very slowly). As such, where it is not possible to use such an approach, the SROI methodology offers simpler ways to estimate attribution, deadweight, displacement, and drop-off, as well as ways to test the sensitivity of the final analysis to errors in these estimations.

For example, subjective estimations of attribution can be formulated through focus groups or questionnaires. For instance, program stakeholders or subject matter experts can be guided through a procedure for estimating attribution that requires them to consider alternative factors that may be responsible for the observed change, before being asked to allocate 100 points to each factor (including the program being assessed) indicating the importance of that factor in facilitating the change. Subjective data such as this can be very useful if objective measures are too difficult to obtain. Furthermore, during the later stages of an SROI analysis, attribution estimates can be varied (e.g. best and worst case scenarios) and the impact on the final SROI ratio can be observed.

After establishing the impact of the program (i.e. changes in outcomes after attribution, deadweight, displacement, and drop off are considered), SROI analysis seeks to place financial values on the outcomes. Most people unfamiliar with SROI analysis raise concerns about estimating the financial values of social outcomes, and usually see it as the most difficult aspect of the approach. However, in comparison to measurement of outcomes and establishing social

impact, estimating the financial values of those outcomes ("monetisation" using proxies of financial value) is relatively easy and can draw upon a number of methods borrowed from economics, such as

- unit cost (e.g. cost savings, for example health outcomes deliver a cost saving to government)
- contingent valuation (e.g. willingness to pay, willingness to accept compensation)
- revealed preference
  - hedonic pricing (e.g. pay accepted to work in a high risk job)
  - travel cost method (e.g. distance travelled to obtain desired goods or services)
  - observed spending on related goods (e.g. spending on other leisure activities could be a proxy for increased participation in a specific leisure activity)

In the majority of cases, financial proxies can be obtained via secondary data sources such as academic literature, government reports, and data sources such as ABS (e.g. household expenditure survey). Where appropriate proxies cannot be obtained from secondary sources, it is possible to obtain estimates of value with carefully designed questions (which can be incorporated into earlier consultation periods that occur as part of the SROI analysis).

Following valuation of the outcomes, it is a relatively simple process to calculate a social return on investment ratio that compares program costs to the social value generated. Where benefits are expected to persist over time, calculating total return usually involves taking into consideration the time value of money so that value generated in the future is referred to in present value terms ("net present value" or NPV).

5.1.3.3 Advantages of SROI analysis

Advantages of undertaking SROI analysis can include the following

- The framework is robust because it attempts to address concepts such as deadweight, displacement, attribution, and drop off. It also allows for sensitivity analysis (to test assumptions and the effects of various scenarios on the final SROI ratio) and encourages analysts to make conservative estimates of a program's value creation, instead of "over claiming".
- SROI can be applied either as a forecast (to predict change) or as an evaluation (to measure change).
- SROI analysis can be applied not just at the project level but also at a program level (group of projects) or at the organizational level.
- SROI analysis converts program benefits into a common language (dollars), which enables comparisons between investments and is also easy for people to understand (particularly if they are familiar with financial measures such as "return on investment" or ROI).
- Potential future investments can be compared on the basis of their SROI ratios in order to inform investment decisions.
- Existing programs can be compared to determine which investments delivered the best value for money.
- SROI also serves as an effective management tool for ongoing investments. The SROI ratio can be tracked over time and used to assess program effectiveness and efficiency. For example, it can be used not only to track program benefits but also how costs (inputs and activities) affect overall program value. This encourages decision makers and program managers to examine ways to reduce program costs in order to increase the program's return on investment ratio.

5.1.4 Worked example using social clusters analysis and SROI analysis

5.1.4.1 Kooragang Wetland Rehabilitation Project

The Kooragang Wetland Rehabilitation Project (KWRP) is a project of the Hunter Central-Rivers CMA (HRCCMA). The aim of the project has been to restore the appearance and estuarine function of the wetlands. Much of the work to date has been undertaken by volunteers, and considerable progress has been made in transforming the project site from degraded land to an area with internationally significant conservation values.

Outcomes for the community have been described as

- Better opportunities for outdoor recreation
- Better opportunities for nature appreciation
- Educational opportunities for schools and interest groups.

Costs have been described as a total investment of $4.5 million over 5 years, plus volunteer time ($500,000 of in-kind labour annually).

5.1.4.2 Applying social clusters analysis

An important first step in assessing the socio-economic impact of investment KWRP is identifying the linkages between people and the resource (which is the Kooragang Wetlands, in this instance). Social clusters analysis (described in Section 5.1.1) could be applied to identify stakeholder groups and assess their socio-economic relationships with the resource.

Identifying stakeholders is also the first step of an SROI analysis – the purpose of which is to establish the impact of investments on stakeholders. Therefore, where a social clusters analysis is performed, the resulting information can be used at the commencement of the SROI analysis.

The first step in such an analysis would be to identify all potential stakeholder groups that are expected to be affected by changes to the condition of the resource. Such an analysis might determine that the following stakeholder groups are immediately relevant:

- Local residents
- Local schools, and their students
- Local businesses (e.g. tourism businesses), their employees, and their suppliers
- Nature groups, and their members.

Consultation with these groups could then be undertaken to establish the nature of their relationship with the resource. For instance, the following questions could be asked of local residents:

- How often do you visit the Kooragang Wetlands?
- What types of activities do you undertake there (e.g. fishing, nature appreciation)?

Similar questions could be asked of schools:

- How many students per year visit Kooragang Wetlands as part of a field trip?
- What education activities are undertaken during those visits?

Through a process of asking these questions of stakeholder groups, it would be possible to quantify the different relationships that exist between the resource and the community. These relationships could then be mapped spatially.

Undertaking social clusters analysis as described above would enable more accurate identification of stakeholders affected by KWRP. Identifying socio-economic relationships between natural

resources and people, in a manner such as this, is a necessary first step in establishing the impact of NRM decisions on economic sustainability and social well-being.

5.1.4.3 Applying SROI after identifying stakeholders or social clusters

The next key step of an SROI after identifying stakeholders is to map out the way in which value is created by the investment, through inputs, activities, outputs, and outcomes. This can be done via desktop research and analysis, but in ideal circumstances the development of the impact map should involve stakeholders. In many respects, the social clusters analysis can provide much information relevant to the impact map (such as the relationship between resource condition and outcomes affecting different stakeholder groups).

The following table provides an example of an “impact map” for an SROI analysis of KWRP. It is not intended to be comprehensive or highly accurate, but is instead designed to illustrate the process of mapping outcomes. This step would normally be achieved through a process of consultation (usually in depth interviews or focus groups with a small sample from each stakeholder group).

When developing the impact map, it is important to consider the potential for “double counting” of outcomes. For example, there are no outcomes assigned to the CMA so as to avoid double counting. The CMA’s objectives relate to outcomes affecting stakeholder groups, such as the broader community. These outcomes, such as “improved resource condition”, are more appropriately assigned to the broader community as the affected stakeholder.

Table 5-2: Mapping relationships between inputs, activities, outputs, and outcomes.

Stakeholder	Input	Activity	Output	Outcome
CMA	Funding and resources	Implement and manage project	Number of rehabilitation activities supported / supervised	No applicable
Volunteers (may include local residents)	One day per week (costed at minimum wage)	Undertake rehabilitation activities	Number of rehabilitation activities performed	• Increased social interaction • Increased personal satisfaction
Local residents	Not applicable	Not applicable	Not applicable	• Increased participation in social & recreation activities (e.g. fishing, nature appreciation) • Improved perceptions of local community and environment • Increased sense of community
Nature groups (not local residents)	Not applicable	Not applicable	Not applicable	• Increased participation in nature appreciation activities
Local schools and students	Not applicable	Not applicable	Not applicable	• Improved educational opportunities
Broader community	Not applicable	Not applicable	Not applicable	• Improved perceptions of community and environment • Improvements to resource condition • Improvements to economic sustainability and social well-being of local community • Increased tourism

When mapping outcomes, it is also important to consider “what matters” and make exclusions from the impact map. For example, there may be a range of other stakeholder groups and outcomes but these may be considered to be affected in a minimal or negligible way. For example, for an environmental project such as KWRP, affected stakeholder groups could be as broad as the national population, or even the global population. However, one of the key principles of the SROI

framework is to only include what is “material” – which requires an assessment of whether or not a piece of information would make a difference to the investment decision. So, for instance, some stakeholders and outcomes should be excluded because their effect on overall program impact – as assessed by an SROI analysis – would not be expected to make a difference to a decision of whether to implement or continue the program.

Having developed the impact map, the next step would be to collect outcomes data and then estimate “impact” – the change in outcomes after accounting for attribution, deadweight, displacement, and drop off.

The following table (Table 5-3 below) provides a worked example for measuring a single outcome: “increased social and recreational activities” among members of the “local residents” stakeholder group, displayed in Table 5-2 above.

The indicator data and estimates of deadweight, displacement, and attribution can be obtained via interviews or surveys of stakeholders. For example, the following questions might be asked in order to obtain the required information

- Have you engaged in social and recreational activities at Kooragang Wetlands in the past 12 months? (provides outcome indicator)
- If yes, approximately how many times have you visited Kooragang Wetlands in the past 12 months for these social and recreational activities? (provides additional information for outcome indicator)
- Has your participation in social and recreational activities at Kooragang Wetlands increased from the previous 12 months? (provides deadweight estimate)
- (If you have participated in social and recreational activities at Kooragang Wetlands…) Considering all the reasons you might have participated in social and recreational activities at Kooragang Wetlands, to what extent do you give direct credit for this to the Kooragang Wetland Rehabilitation Project (as a percentage)? (provides attribution estimate)
- Has your participation in social and recreational activities at Kooragang Wetlands simply replaced other types of social and recreational activities at other locations? (provides displacement estimate)

Table 5-3. Establishing impact for a single outcome.

Stakeholder group	Number of potentially affected stakeholders (population of neighbouring communities)	Outcome	Indicator description	Indicator	Outcome incidence	Deadweight	Attribution	Displacement	Incidence after deadweight, attribution, and displacement
Local residents	100,000*	Increased social & recreation activities	Average number of days in past 12 months that stakeholders have participated in social & recreational activities at Kooragang Wetlands	0.25 days	25,000	10%	75%	50%	8,437 days

*For illustrative purposes only and not intended to be accurate. Could be determined via social clusters analysis.

After establishing impact, the next step is to value the outcomes using relevant financial values or proxies, and then take into account annual drop off. In the example in Table 5-4 below, the outcome being valued is “increased social & recreation activities” and the financial proxy that has been selected for this outcome relates to spending on such activities. This is an example of a “revealed preference” method of estimating value (and specifically, a “spending on related goods” method).

When selecting proxies, it is possible that there will be a range of options available. For instance, this particular outcome could potentially have been valued using the “travel cost method” – where the average cost of travelling to the location to undertake the activity could be used as a financial proxy. Another method for valuing recreational activity is to measure the amount of time spent on the activity and converting that time into money (for instance, using the average salary). Table 5-5 provides some additional examples of proxies for a range of outcomes.

However, while there are usually multiple ways to value an outcome, there are two considerations to be made when selecting financial proxies. First, since a key principle of SROI is to avoid “over-claiming” or exaggerating the value created, it is usually advisable to use a lower valuation in favour of a higher valuation (e.g. when valuing time, it may be appropriate to use the minimum wage rather than the average salary). Second, even if more proxies are available, each outcome should only be assigned one proxy. Assigning more than one proxy will double count the value of the outcome. However, in some cases it may be appropriate to take the average value of a range of different proxies, in order to improve the reliability of the value estimate.

As shown in Table 5-4, multiplying the outcome incidence by the financial proxy for that outcome provides the overall yearly value of that outcome. Then, it is possible to consider long-term benefits after taking into account “drop off.” As discussed earlier, drop off occurs when the outcome deteriorates over time (outcome drop off), or when the credit the program can take for the outcome drops off over time (attribution drop off).

Drop off can be a significant problem in relation to some projects, but less of an issue in others. For instance, programs designed to deliver training and eventually improve the employability of the participant may be able to take significant credit for an outcome after the first year following the training (e.g. the participant secures a job). However, five years later, the initial training program is unlikely to be able to claim much credit for the person’s employment because other factors will have come into play (e.g. their experience). This is an example of attribution drop off.

There are various ways of measuring drop off. In this example, it has simply been estimated using some logic and estimation. In the case of KWRP and this specific outcome, there are few reasons to assume that the outcome of increased participation in social and recreational activity at Kooragang Wetlands would decrease over time. As such, a low drop off rate has been applied (five percent). Survey questions could also be designed to assess drop off. However, where there is concern about the quality of the estimate, it is a simple process to vary the estimate during the sensitivity analysis phase of an SROI analysis to determine the extent to which the final SROI ratio is affected by variance in the estimate (for example, what happens to the return on investment ratio if drop off is increased from 5 to 50 percent?).

Although not shown in this example, the value of future years can then be converted to their present value (factoring in the time value of money). These values could then be added to produce a total amount for the value of the outcome, over time. This amount can then be added to the values of all the other outcomes and compared to the project’s costs to produce the overall return on investment ratio.

Table 5-4. Valuing outcomes and factoring in drop off

Stakeholder group	Outcome	Incidence after deadweight, attribution, and displacement	Financial proxy description	Outcome value	Total annual value produced	Annual drop off (5%)			
					Year 1	Year 2	Year 3	Year 4	Year 5
Local residents	Increased social & recreation activities	8,437 days	Average daily spending per person on recreational activity[1]	$10.87	$91,710	$87,125	$82,768	$78,630	$74,699

1. ABS (2011). Australian Bureau of Statistics Household expenditure survey (2009-10).

Table 5-5. Examples of proxies for other KWRP outcomes

Stakeholder	Outcome	Indicator	Financial proxy
Local residents	Improved perceptions of local community and environment	Number of residents reporting improved perception of local area	Changes in property prices, as a function of proximity to Kooragang Wetlands
Local schools	Improved educational opportunities	Number of students participating in field trips to Kooragang Wetlands	Costs associated with travel to an equivalent educational site

5.2 Additional resources for Social Impact Assessment methodologies

Table 5-6, on the following page, provides additional resources for Social Impact Assessment methodologies.

Table 5-6: Summary of existing frameworks and guidelines for socio-economic assessment within NRM.

Framework/ Guidelines/ Principles	Organisation / Author	Aim(s)	Approach / Method
Social Impact Assessment for NRM			
Guidebook on social impact assessment	Fenton, M. (2005) Prepared for the Comprehensive Coastal Assessment by Environment and Behaviour Consultants, Townsville, QLD.	To provide planners, policy makers and others involved in regional and urban planning with an initial conceptual and applied methodological framework for understanding and undertaking social impact assessments (SIAs).	The Guidebook describes four specific methods useful in a SIA context: 1. Human service provision thresholds, 2. Demographic profiles and social indicators, 3. Place meanings and environmental values, and 4. Network analysis. The Comprehensive Coastal Assessment process is aimed at providing decision support tools to improve strategic planning, land use, natural resource protection and socio-economic development along the NSW coast.
International principles for social impact assessment	Vanclay, F. (2003) International Association for Impact Assessment (IAIA).	To provide the principles of Social Impact Assessment (SIA) for practitioners to use and discuss around the world.	The principles provide a basis for developing national guidelines in consultation with a range of stakeholders and users. It establishes the core values of the community of practice then derives the principles - it is from this point that truly appropriate and specific guidelines and methods can then be developed.
Guidelines and principles for social impact assessment	The Interorganizational Committee on Guidelines and Principles for Social Impact Assessment (1994)	To present the central principles and some operational guidelines for conducting social impact assessments (SIAs). This document is systematic and interdisciplinary in nature and offers guidelines and principles to assist government and private sector agencies in using SIA to make better decisions.	The guidelines provide a broad overview, focusing less on methodological details and more on the guidelines and principles for the preparation of technically and substantively adequate SIAs within reasonable time and resource constraints

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US principles and guidelines - Principles and guidelines for social impact assessment in the USA	The Interorganizational Committee on Principles and Guidelines for Social Impact Assessment (2003)	To provide guidance for the conduct of social impact assessment (SIA) within the context of the US National Environmental Policy Act of 1970.	Guidelines are integrated within six focus areas: 1. understanding of local and regional settings; 2. dealing with the key elements of the human environment; 3. using appropriate methods and assumptions; 4. providing quality information for decision making; 5. ensuring that environmental justice issues are addressed; 6. and establishing mechanisms for evaluation/ monitoring and mitigation. A social impact assessment model is outlined followed by suggested social impact assessment variables.
***The Burra Charter* (The Australia ICOMOS charter for places of cultural significance)**	International Charter for the Conservation and Restoration of Monuments and Sites & the International Council on Monuments and Sites (ICOMOS)	To provide guidance for the conservation and management of places of cultural significance (cultural heritage places), based on the knowledge and experience of Australia ICOMOS members.	The Charter sets a standard of practice for those who provide advice, make decisions about, or undertake works to places of cultural significance, including owners, managers and custodians. The Charter can be applied to all types of places of cultural significance including natural, indigenous and historic places with cultural values.
Guide to investigating, assessing and reporting on Aboroginal cultural heritage in NSW	Office of Environment & Heritage (OEH)	To Provide guidance on the process for investigating and assessing Aboriginal cultural heritage in NSW, and OEH's requirements for an Aboriginal cultural heritage assessment report.	The guidelines suggest the following steps 1. review background information 2. initiate ongoing consultation 3. identify and assess cultural heritage values 4. assess harm 5. avoid harm (if possible) 6. minimise the impacts (if harm cannot be avoided) 7. document findings
Economic Impact Assessment for NRM			
NSW Government guidelines for economic	NSW Treasury (2007), Office of Financial Management, Policy & Guidelines Paper	To help choose the best means to satisfy a specified objective, and to rank competing proposals when resources are limited.	The Guidelines promote a consistent approach to undertaking such appraisals for the assessment of significant spending proposals, including proposed capital works projects and new programs. They are appropriate for

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appraisal	www.treasury.nsw.gov.au/__data/assets/pdf_file/0016/7414/tpp07-5.pdf		the application of economic appraisal to other areas such as asset management, plan and program evaluation, and regulation review proposals.
NSW guide to better regulation	NSW Department of Premier and Cabinet (2008), Better Regulation Office	To help NSW agencies develop regulation which is required, reasonable and responsive.	The Guide provides details on how to apply the better regulation principles to meet the NSW Government's commitment to cut red tape.
Introduction to cost-benefit analysis and alternative evaluation methodologies	Commonwealth of Australia (2006), Department of Finance www.finance.gov.au/publications/finance-circulars/2006/docs/Intro_to_CB_analysis.pdf	To introduce Cost-Benefit Analysis (CBA) in a non-technical way and outlines the basic steps for its use.	Cost-benefit analysis (CBA) is a method of quantitative economic analysis that is widely used to evaluate existing and proposed projects, programs and policies, and which can inform decision-making. Although CBA is generally a useful instrument for the evaluation of projects, programs and policies, and for showing the opportunity costs of such projects and policies, the use of CBA may not always be appropriate. When performing an evaluation, the choice of evaluation methodology should be appropriately documented and defensible.
Best practice regulation handbook and guide for Ministerial Councils and national standard setting bodies	Australian Government (2007), prepared by the Office of Best Practice Regulation, Canberra www.finance.gov.au/obpr/docs/handbook.pdf	To set out Commonwealth Government requirements for regulatory impact analysis. Compliance with these procedures and processes is *mandatory* for all Australian Government departments, agencies, statutory authorities and boards that make, review or reform regulations. The Commonwealth Government hopes to improve the analysis of proposals and hence the quality of regulation through a structured approach to policy development.	The Guide provides direction for undertaking regulatory impact assessment and preparing a Regulation Impact Statement (RIS) including assistance on undertaking: 1. risk analysis 2. cost-benefit analysis 3. assessments of compliance costs 4. assessments of competition effects, and 5. consultation.
The Green Book - Appraisal and evaluation in central	United Kingdom Department of Treasury (2003) www.hm-treasury.gov.uk/data_greenbook_i	To promote efficient policy development and resource allocation across government.	The Green Book describes how the economic, financial, social and environmental assessments of a policy, program or project should be combined. The methodology should be used to make an economic assessment of the social costs and benefits of all new policies, projects & programs

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government	ndex.htm		including economic assessment under regulatory impact analysis.
Economics for accountability in community-based environmental governance	Marshall, G., McNeill, J and Reeve, I. (2009). Prepared for Institute for Rural Futures, University of New England, Armidale, NSW. www.ruralfutures.une.edu.au/downloads/WP2_373.pdf	To identify an approach to economic accountability that is: consistent with a community-based strategy for environmental management; cost-effective to apply given the capacities of community-based organisations; and, consistent with an 'economic way of thinking'.	Three methods for maintaining economic accountability are distinguished: 1. benefit-cost analysis; 2. multi-criteria analysis; and 3. deliberative methods.
The investment framework for environmental resources	The INFFER approach www.inffer.org	To help investors achieve the highest value environmental and natural resource outcomes that are possible with the available resources. It covers environmental threats such as water quality decline, salinity, biodiversity decline and pest plant and animals.	The approach starts by identifying the environmental assets that may warrant investment and proceeds through a series of steps for each asset: collecting specific information about the asset and its potential management; evaluating the cost effectiveness of investment; and identifying appropriate policy responses. It identifies projects with the best prospects.
A Framework for the economic assessment of ecological benefits	United States Environmental Protection Agency (2002) www.epa.gov/osa/spc/pdfs/feaeb3.pdf	To provide a common approach to analysing ecological benefits and a better understanding of both the scientific and economic techniques used in these analyses.	This document is intended to address these needs by: 1. proposing a common framework for the economic analysis of ecological benefits; and 2. discussing the elements of ecological risk assessment and economic benefit analysis. The Framework is most applicable for determining, as part of a benefit cost analysis, the ecological benefits of policies or regulatory actions commonly undertaken by governmental agencies such as the EPA.
Use of market based instruments by Catchment	Collins, D. and Whitten, S. (2007). Report to the NSW CMA Chairs' Council, prepared by the BDA Group and CSIRO Sustainable	To assist NSW Catchment Management Authorities (CMAs) in their selection and use of Market-Based Instruments (MBIs) for NRM.	In this report, a preliminary overview of experiences with Market-Based Instruments (MBIs) for NRM is canvassed, and a framework for the selection of MBIs across differing biophysical, economic and stakeholder contexts is presented.

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Management Authorities in NSW to achieve landscape scale change	Ecosystems. www.lachlan.cma.nsw.gov.au/download.cfm?DownloadFile=49A03F9B-1708-51EB-A69387EC296A4F10		
Integrated Socio-Economic Impact Assessment for NRM			
Conducting social & economic impact assessment: a practical guide for NRM bodies	Stanley, J., Clouston, B, Binney, J. (2004). Prepared for Queensland Dept of Natural Resources, Mines & Water www.regionalnrm.qld.gov.au/research_sips/sips/social_economic/pdf/impactassessment.pdf	To provide practical advice for undertaking social and economic impact assessments when designing Natural Resource Management (NRM) plans and investment strategies.	By following the basic procedures outlined in these guidelines and involving the public in the SEIA and decision-making process, regional NRM bodies can both identify potential impacts, while also avoiding conflict of proposed management actions.
Integrating economic and social issues in regional natural resource management planning: a framework for regional NRM bodies	Cavaye, J. (2003) National Action Plan for Salinity and Water Quality, Queensland Department of Natural Resources, Mines & Water. www.dpi.nsw.gov.au/environment/guidelines-socioeconomic-analysis-nrm-decisions/integrating-economic-and-social-issues-in-regional-natural-resource-management-planning.pdf	To assist regional bodies to incorporate economic and social considerations in regional planning and conduct appropriate social and economic analysis.	It provides a logical framework, background information, methods and tools, and references to further sources of assistance in laypersons terms. This is undertaken in three ways: 1. Comparing proposed options to help formulate strategies, e.g. broad scale soil erosion prevention versus more targeted mitigation; 2. Assessing the 'triple bottom line' impacts of existing strategies and targets, e.g. improving water quality; 3. Comparing or assessing the impacts of components or actions involved in existing strategies, e.g. changes to irrigation practice
Socio-economic assessment guidelines for river, groundwater and water management	Independent Advisory Committee on Socio-economic Analysis (1998) www.water.nsw.gov.au/ArticleDocuments/34/socio-economic%20guidelines.pdf.aspx	To provide River, Groundwater and Water Management Committees with an understanding of how they might carry out a community based socio-economic assessment in the context of the broader water reform process.	The framework proposes a number of steps, including: 1. profiling the catchment; 2. identifying and assessing the effects of changes in water management regimes; 3. prioritisation of options; 4. presentation of effects in a consistent manner to

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committees			government and the catchment community.
Socio-economic impact assessment toolkit - A guide to assessing the socio-economic impacts of Marine Protected Areas in Australia	Department of the Environment and Heritage (2005) www.environment.gov.au/coasts/mpa/publications/nrsmpa-seia.html	To provide a general guide to undertaking socio-economic impact assessment (SEIA), followed by specific guides to methods and sources of information which can be used in assessing the potential impacts of proposed Marine Protected Areas on these selected sectors.	It provides a range of options for assessing social and economic impacts, and advice on appropriate methods for particular situations, including: 1. Scoping; 2. Baseline profiling and identifying who will be impacted; 3. Assessing direct impacts: secondary data analysis of existing data sources; primary data collection such as surveys and focus groups; 4. Assessing flow-on impacts: regional profiling; surveys and focus groups; modelling. Uses and limitations of each method are included, such as likely cost and time required to implement, and the type of information each method can provide.
Resilience assessment in social-ecological systems	The Resilience Alliance www.resalliance.org/3871.php	To provide two workbooks for assessing resilience in social-ecological systems: 1. Assessing and managing resilience in social-ecological systems: A practitioner's workbook; and, 2. Assessing resilience in social-ecological systems - A workbook for scientists.	The practitioner's workbook has been developed specifically to provide guidance to people engaged in natural resource management, through a set of activities designed to explore system parameters and management options for their own system of interest from a resilience perspective. A companion volume (Vol. 2) to the workbook for practitioners provides supplementary notes on the key concepts that are included in the assessment. The Resilience Assessment workbook for Scientists emerged from case-study comparisons of regional SESs in the Resilience Alliance and builds on an initial suggested framework. It is intended as a guide for those familiar with the basic concepts of resilience and systems dynamics.

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Assessing the contribution of investment in natural resource management to economic sustainability and social well-being	Gale, R., Brock, P. & Milham, N. (2010) Technical Report 12 of Monitoring, Evaluation & Reporting Program. Technical Report Series, Industry & Investment NSW.	To provide a rapid appraisal approach for gathering evidence specifically about Target 12: 'Natural resource decisions contribute to improving or maintaining economic sustainability and social well-being (ESSW)' with the NSW State Plan.	The document provides a means of assessing Target 12 through a low cost rapid appraisal of ESSW. The approach includes a seven-step rapid technique: 1. Plan the ESSW MER; 2. Select indicators beyond designated indicators (if required) and formulate questions; 3. Review existing socio-economic information and/or investment programs; 4. Decide who to talk to; 5. Collect qualitative data; 6. Collate data from different sources; and, 7. Initiate CMA and agency 'organisational learning'
Assessing capacity of natural resource managers	Jacobs B, Brown P, Nelson R, Leith P, Tracey J, McNamara L, Ahmed M and Mitchell S (2011) *Assessing the capacity to manage natural resources in NSW,* Monitoring, evaluation and reporting program, Technical report series, Office of Environment and Heritage, Sydney	To assess NR managers' capacity to adapt their management practices to achieve improved environmental outcomes.	The approach is based on rural livelihoods analysis (Ellis, 2000) and uses self-assessment processes to rate capacity against a range of indicators organised according to five capitals framework (financial, human, social, natural, and physical). This participatory method provides a subjective, quantitative assessment of NR capacity.