

**Signposts for Australian Agriculture – Review of social  
components of the framework**

**Final report prepared for the Bureau of Rural Sciences**

**2006**

**Jacki Schirmer**

**School of Resources, Environment and Society – Australian  
National University**

# 1. Introduction

*Signposts for Australian Agriculture* is a project coordinated by the National Land and Water Resources Audit, with initial funding from the Department of Agriculture, Fisheries and Forestry. Recognising the importance of this initiative, the Bureau of Rural Sciences has allocated its own funding to support Signposts. The 2005-06 funding includes provision to carry out a review of the social components of the *Signposts for Australian Agriculture Framework*. This review follows on from a review carried out by ABARE focussing on the human components of the framework, which at that time included both economic and social components.

This report reviews the social components of the framework, and includes discussion and recommendations on:

- the goals of the social components of the framework;
- social indicators – what they are, and current knowledge on designing appropriate indicators to measure concepts including quality of life, human well-being and social capital. This underpins subsequent review of the social components of the framework;
- the overall structure of social components of the framework;
- the suitability of current social sub-components of the framework and suggested modifications; and
- for each original or modified social component, specification of objectives or desired outcomes, suggested indicators, and discussion of availability of data.

The review has used the Signposts Stage 2 report (Chesson *et al.* 2005), which incorporates the ABARE review, as a starting point. The ABARE review recommended that indicators clearly measure data about the industry being examined, and three specific social indicators:

- Health – number of farm accidents;
- Employment – number of people employed in the industry; and
- Education – level of education/training of those involved in the industry.

These three indicators are reviewed in this report as relevant components of the framework are discussed.

## 2. Goals of the social components of the framework

The first step in identifying appropriate indicators of the social contributions of agricultural industries is to identify the goal/s of those indicators - in other words, the underlying question that the indicators should be designed to answer<sup>1</sup>.

The Signposts framework:

... has been designed to address the question:

How does an agricultural industry contribute to ecologically sustainable development?

where ecologically sustainable development (ESD) is defined as:

*Using conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased* (National Strategy for Ecologically Sustainable Development, Commonwealth of Australia 1992). (Chesson *et al.* 2005)

'Total quality of life' has been expressed in terms of the value of our capital assets (human capital, social capital, produced capital, natural capital, etc).

Based on this concept, the social components of the framework should aim to address two related questions:

How are human assets (human and social capital) 'belonging' to the industry changing over time?

How does an agricultural industry contribute to human assets (human and social capital) extending beyond the industry?

---

<sup>1</sup> This first step follows the approach recommended by most researchers and international agencies for development of social indicators, in which:

... any attempt to derive social indicators directly from existing statistics has been deliberately rejected. The preferred approach has been to elaborate a list of social concerns, sub-concerns, and if necessary sub-sub-concerns, and to construct valid indicators to measure them. Only then should an attempt be made to match data to indicators. (OECD 1976: 9)

### **3. Social indicator frameworks: current practice**

#### **3.1. Brief history of social indicator framework development**

There is a considerable body of theoretical and applied work on the development of frameworks for social indicators. Understanding current approaches to developing frameworks requires a brief review of the history of social indicator development.

The term ‘social indicator’ emerged into common international usage from the 1950-60s. The use of social indicators goes back even earlier than this, to at least the 1700s (Miles 1985, Michalos 2004, Kalimo 2005).

The field of social indicator development largely developed in response to concerns over the widespread use of statistics such as Gross Domestic Product per capita (GDP/capita) as proxy measures of quality of life. Concerns were raised by international agencies, such as the OECD and World Bank, and by researchers, that changes in GDP/capita did not necessarily equate to changes in quality of life or well-being of a population. In addition, concern was expressed that statistics such as GDP/capita failed to measure distributional differences within a population (Carley 1981).

Subsequent studies examining the relationship between GDP/capita and well-being have usually found GDP/capita is at best a partial explanatory factor in overall well-being or quality of life (Carley 1981, Stewart 2005):

The evidence for any relationship between GDP/capita growth and growth in subjective well-being in wealthier countries is disputed, at best ... (Kenny 2005: 199)

A considerable body of theory and practice has subsequently developed in the field of social indicators. International bodies including the UNDP, World Bank and OECD, amongst others, have invested in ongoing research aimed at developing social indicators that meaningfully represent changes in quality of life (Michalos 2004). A large body of academic research has also been undertaken (see for example *Social Indicators Research*, the international journal reporting on research in this area).

#### **3.2. Why is a social indicator framework needed?**

A key focus of social indicator development is development of appropriate theoretical frameworks within which specific indicators can be developed. Ongoing debate over the definition of the term ‘social indicator’ reflects this emphasis. There are two common definitions of the term ‘social indicator’, only one of which is now widely accepted. The first defines a social indicator as any statistic that describes some aspect of a human population:

...(a) statistic of direct normative interest which facilitates concise, comprehensive and balanced judgments about the condition of major aspects of a society (US Department of Health, Education and Welfare 1969 cited in Cummins *et al.* 2003: 161)

However, critics of this definition argue that it inappropriately equates social indicators with social statistics, the latter being descriptive statistics not designed to meaningfully measure underlying concepts such as well-being or quality of life (e.g. Cummins *et al.* 2003).

Despite this criticism, this definition is often used in practice. Many sets of social statistics are presented and labelled as ‘social indicators’, without accompanying examination or presentation of the underlying concepts the statistics are believed to represent. For example, Bray (2000) presents sets of social indicators for regional Australia, but does not argue how or why the statistics presented are indicative of a state of social well being or quality of life.

The second, and more widely accepted, definition, of the term ‘social indicator’ emphasises that an indicator is explicitly developed to measure some underlying social concept or attribute – in other words, an indicator must be designed within an explicit theoretical framework that aims to measure identifiable goals/outcomes:

Easily identified features of a society which can be measured, which vary over time, and are taken as revealing some underlying aspect of social reality. (Marshall 1998: 614)

The term ‘social indicators’ is used to denote a social statistic that is supposed to have some significance for the quality of life. (Michalos 2004: 29-30)

As measures of welfare and social change social indicators are supposed to refer to societal goals and be relevant for the policy making process. (Noll 2002: 49)

... instruments which use social data to represent developments in the operation of social processes and the realization of social goals. (Miles 1985: 16)

This second definition requires that a social indicator be justified in terms of its meaning for an underlying concept that is used as the basis for developing an indicator framework. In the case of this review, that underlying concept is ‘total quality of life’<sup>2</sup>.

Criticisms are commonly made of attempts to use social indicators to monitor well-being/quality of life. While these criticisms are important and raise serious questions about the extent to which it is possible to adequately represent what are phenomena experienced in a unique way by each individual, it is also important to clearly set out the goal of a social indicator, which is to provide a proxy, or indirect measure, of those things which cannot be directly measured:

... all measures of quality are proxies – indirect measures of the true condition we are seeking to judge. If quality could be quantified, it would cease to be quality... (Cobb 2000: 5)

In order to develop the most appropriate proxies, it is essential to base the indicators being developed on ‘a theory of what makes up a good life’ (Cobb 2000: 6).

### **3.3. Common social indicator frameworks**

A range of social indicator frameworks are used internationally. Many – if not most - have relatively similar goals and contain similar components.

This section provides an overview of common social indicator frameworks. Following this, Section 3.4 examines typical components of social indicator frameworks that have been specifically developed to examine rural well being and/or sustainable development outcomes.

Social indicator frameworks are typically structured based on one or more of:

- The type of indicators being used;

---

<sup>2</sup> For other examples of underlying goals, see Noll (2002), who discusses the desired social outcomes to be monitored by a European system of social indicators.

- The theoretical perspective utilised to examine quality of life and well-being; and
- The different components that need to be included to fully encompass the social outcomes the framework aims to measure (e.g. to monitor changes in quality of life).

### **3.3.1. Types of indicators**

Perhaps the most common framework structured around different types of indicators is the pressure-state-response (PSR) model, in which indicators representing different social pressures, social ‘states’ and social responses are measured (e.g. Kalimo 2005). The United Nations Commission for Sustainable Development has developed the related ‘DSR’ – ‘driving force, state and response’ – framework, within which indicators representing driving forces, current state and responses have been developed.

Sen (1993), meanwhile called for quality of life to be measured by examining the capabilities and resources people have access to, which determine the extent to which they can improve their quality of life. Various types of individual capabilities and individual/societal resources can be identified utilising a ‘capabilities and resources’ framework.

### **3.3.2. Theoretical perspectives**

Differences in theoretical perspectives lead to substantial differences in the indicator frameworks developed to measure concepts such as quality of life.

Cobb (2000) identified a fundamental split between those who follow the utilitarian view that quality of life is a property of individuals, and those who consider it to be a product of both the individual and society. In recent years the latter view has been increasingly followed, with emphasis on how an individual’s personal characteristics interact with the opportunities provided in the social and economic settings they live in (e.g. Sen 1993).

When this latter view is taken, social indicator frameworks typically incorporate components based both on the individual and on the social capital available to individuals and communities – an approach consistent with the Signposts framework.

### **3.3.3. Components of social goals**

Much of the literature on social indicator frameworks focuses on identifying the components that are needed in a framework if the social outcomes being examined are to be adequately monitored. This aspect of framework development asks:

What components are needed to measure changes in the social outcomes the frameworks aims to monitor?

Answering this question requires briefly reviewing the social outcomes social indicator frameworks are typically developed to monitor. These are surprisingly similar across different frameworks, with the frameworks typically designed to monitor changes in:

- Quality of life;
- Happiness;
- Life satisfaction;

- Well-being;
- Welfare (this term is less commonly used than the two above);
- Social capital;
- Social inclusion; and/or
- Social exclusion.

A key challenge in the literature is the overlapping use of different terms to refer to similar concepts (Frisch 1998: 23). While definitions do vary somewhat across the different terms, in general:

- Quality of life, well-being and welfare are defined in ways which overlap considerably. Quality of life tends to be used as a term related to well-being, but also sometimes encompassing social capital/cohesion/exclusion. The term ‘well-being’ is also sometimes used to refer to concepts that could be considered to incorporate social capital; and
- Social capital, social cohesion and social exclusion are highly related concepts.

Because of these similarities, approaches to quality of life, well-being and welfare frameworks are discussed as a group in Section 3.3.3.1, while social capital, social inclusion and social exclusion are discussed together in Section 3.3.3.2.

### 3.3.3.1. Quality of life/well-being/welfare

Quality of life, well-being and welfare are often defined in similar, or at least related, ways, although ‘quality of life’ in particular is sometimes used to refer to broader concepts incorporating social capital and related terms. Table 1 below provides common definitions of each term. Because of the similarities in definition of these terms, they are discussed as a single group in this section.

**Table 1: Definitions of quality of life, well-being and welfare**

Term	Definition
Quality of life	It is difficult to find a consistent definition of quality of life. The Dictionary of Sociology does not directly define quality of life, instead stating that ‘The idea of (improving) quality of life is central to many community programmes, to public policy, to development legislation ... However the concept itself is controversial ... an adequate measure of quality of life must be plural and should recognize that distinct components of well-being are irreducible to each other.’ (Marshall 1998: 544). The following are representative definitions:  ‘The degree to which intellectual, spiritual, economical, social and health pursuits are achieved and maintained.’ (Office of the Voluntary Sector, n.d.)  ‘... the degree of excellence in life (or living) relative to some expressed or implied standard of comparison...’ (Frisch 1998: 19)  ‘A construct that "connotes an overall sense of well-being when applied to an individual" and a "supportive environment when applied to a community”’ (Moriarty [1996] cited by NACCHO [n.d.]
Well-being, subjective well-being, social well-being	‘Subjective well-being is seen as an overall state of well-being that is determined by a person’s ability to obtain the universal goals of physical and social well-being and their perspective on the future. In turn, social well-being is assumed to be realised through ... forms of social approval.’ Nieboer <i>et al.</i> (2005: 316-7)  ‘The constellation of good living conditions and positive subjective well-being is called well-being’ (Noll 2002: 51)

Term	Definition
	'This term is usually used to refer to 'the aggregate well-being of individuals', rather than the well-being of a society which incorporates concepts of social capital' (OECD 1976: 12).
Welfare	'Welfare is the state or condition of doing or being well.' (Marshall 1998: 701)

Considerable debate occurs over the meaning of all the terms defined in Table 1. What is generally agreed is that the factors affecting quality of life/well-being/welfare (hereafter referred to as quality of life) can differ substantially for different people:

... different groups of people with different life circumstances, resources and constraints use different mixtures of ingredients to determine their happiness. (Michalos 2004: 27)

Quality of life is an inherently subjective topic. What is 'quality of life'? What is its value or worth? How should it be measured? Should people's subjective perceptions be relied on, or should external – 'objective' – measures be used? Should a combination of objective and subjective measures – as commonly suggested in recent years - be used (Noll 2002)?

Table 2 below summarises key components that have commonly been identified as influencing or representing some dimension of quality of life. These have been commonly used as a starting point for the development of social indicators that meaningfully represent each component.

**Table 2: Components typically utilised in quality of life/well being social indicator frameworks**

Indicator type	What does it measure?
Freedom, justice	Many researchers have found that people living in nations with higher levels of freedom and justice (measured in different ways, but usually equating democracy and lack of corruption as indicating higher levels of freedom and justice) tend to report higher levels of subjective well-being (e.g. Veenhoven 2005).
Material well-being (income, wealth)	The extent to which household or personal income and wealth impact on quality of life is widely debated, but many researchers agree that economic affluence influences quality of life, while not being the sole determinant (e.g. Stewart 2005, Veenhoven 2005).
Income/wealth distribution	It has long been argued that inequitable distribution of income and wealth in a society may be a marker of lower quality of life than more equal distribution. However, this is a topic of considerable debate, and different studies have produced widely varying results on the influence of income distribution. Veenhoven (2005: 61), for example, found that income equality did 'not appear to be required for a long and happy life' when statistically analysing the relationship between subjective well being, life expectancy and income equality.
Health	The effects of health on quality of life have been widely researched, as have the effects of quality of life on health (e.g. Fotso and Kuate-Defo 2005). A strong link between the two is widely accepted. Michalos (2004: 56-57) reviewed several studies and found that 'if 'quality of life' is interpreted as 'happiness' then good measures of health explain anywhere from almost a half to only a fifth of the quality of people's lives'.  There are many types of health indicator, including subjective and objective, input, process and output measures (e.g. Stewart 2005). A common measure is life expectancy, with longer life often considered to represent improved health outcomes and included in international indices such as the Human Development Index. However, its use in developed countries has been questioned, with some concern that as life expectancy increases, there may be

Indicator type	What does it measure?
	an increase in age-related health problems, and hence a falling quality of life associated with increasing life expectancy (e.g. Perenboom <i>et al.</i> 2004: 227). As a result, measures such as 'healthy life years' are often recommended instead of life expectancy (e.g. Lind 2004, Veenhoven 2005).
Social capital/ social interaction	This refers to indicators seeking to measure social interaction, or the effectiveness of relationships between individuals and groups. Often the indicators used attempt to measure the quantity of interaction of particular types, e.g. meeting with neighbours, friends or groups (Stewart 2005).
Subjective well-being	Subjective well-being indicators ask, usually via questionnaires, how happy or satisfied a person is with their life and various aspects of it. Various standardised surveys have been developed (Noll 2002), and considerable theory developed, particularly in the field of social psychology. For example, Social Production Function (SPF) theorists argue that, 'people try to improve their life situation by optimizing two universal goals (physical and social well-being) and five instrumental goals by which these universal goals are achieved (stimulation and comfort for physical well-being, and status, behavioural confirmation and affection for social well-being)' (Nieboer <i>et al.</i> 2005: 315).
Living conditions	Living conditions are commonly found to affect levels of subjective well being. Specific measures include measures of housing quality, access to services such as electricity, water and sewerage, square metres of living space, access to transport, access to services, and noise and air pollution (Noll 2002).
Productive activity (employment, other)	Working conditions are commonly found to influence overall quality of life. Dimensions measured include the opportunities and risks in the available labour market, employment level (e.g. level of under- or over-employment), physical and psychological working conditions, and level of unemployment. Inequalities in employment may also be measured via measures of employment by gender, race, and region (Noll 2002, Stewart 2005).
Family structure	Family structure indicators utilise data such as the proportion of people in formal partnerships or marriages, and other aspects of family structure, arguing that particular family structures are associated with differences in quality of life. There is some recent evidence in Australia that women and men in formal marriages 'experience higher levels of [subjective] life satisfaction than do people in other family arrangements' (Evans and Kelley 2004: 303); however claims about the presence of this type of relationship are generally contentious.

### 3.3.3.2. Social capital/social cohesion/social exclusion

Many social indicator frameworks incorporate indicators of social capital/ social inclusion/social exclusion in addition to indicators of the quality of life of individuals. The concept of social capital is often related to concepts of social inclusion and social exclusion, and so these three concepts are discussed together:

The concepts of social cohesion, social exclusion and social capital are all closely related to each other, and there are further concepts such as social inclusion, social integration, and civil society which could be mentioned in this context as well. ... all these concepts can be seen as being primarily concerned with the possibilities and preconditions of societal integration and solidarity (Noll 1999: 19). Common to all concepts is the concern with the interrelations between units of the society such as individuals, groups, associations, institutions as well as territorial units. (Noll 2002: 53-54)

Table 3 provides common definitions of social capital, social cohesion, and social exclusion, and highlights the inter-related nature of these concepts.

**Table 3: Definitions of social capital, social cohesion and social exclusion**

Term	Definition
Social capital	<p>‘Social capital has been defined as the set of cooperative relationships between social actors that facilitate collective action...’ (Requena 2003: 331)</p> <p>‘The concept of social capital covers topics like the density and quality of relationships and interactions between individuals and groups, their mutual feelings of commitment and trust due to common values and norms, a sense of belonging and solidarity ...’ (Noll 2002: 56).</p> <p>‘Social capital relates to the resources available within communities in networks of mutual support, reciprocity, and trust. It is a contributor to community strength. Social capital can be accumulated when people interact with each other in families, workplaces, neighbourhoods, local associations, interest groups, government, and a range of informal and formal meeting places’ (ABS 2004).</p>
Social cohesion	<p>‘The concept of social cohesion incorporates mainly two goal dimensions of societal development ... the reduction of disparities, inequalities, fragmentations and cleavages ... [and] forces strengthening social connections, ties and commitments to and within a community.’ (Noll 2002: 55)</p>
Social exclusion	<p>Noll (2002: 55) identifies three meanings of social exclusion, the first defined as ‘a disruption of the social ties between society and the individual due to the failure of institutions’, the second as ‘a result of social differentiation and specialisation’ and the third in which exclusion ‘is the result of processes of social closure by which more privileged groups protect their monopoly position.’</p>

A wide variety of indicators are used to examine social capital, and there is considerable debate over which are most appropriate representations of social capital. The distinguishing feature of all is that they examine aspects of relations between groups, whereas most other quality of life measures examine statistics that are reducible to individuals. In other words, indicators of social capital are a property of groups/societies, not of individuals.

It is important to highlight that social capital does not always have what are commonly regarded as beneficial properties. The Productivity Commission (2003) emphasise that social capital can have both positive or negative impacts – for example, groups that are highly cohesive and integrated may not be welcoming of new members, and may display intolerance towards those different to themselves.

Typical components of social capital frameworks include those outlined in Table 4.

**Table 4: Components typically utilised in social capital indicator frameworks**

Component of social capital	Description
Norms – trust	<p>A norm is a ‘a shared expectation of behaviour that connotes what is considered culturally desirable and appropriate.’ (Marshall 1998: 453).</p> <p>Norms relating to trust are considered to form a key part of social capital, as trust is required for many – if not most – types of productive social interaction to occur. Norms of trust are measured by examining the extent to which different individuals and groups are considered trustworthy/honest e.g. a person’s family, friends, employer, colleagues, or members of the broader community (Putnam 2000, Stone 2001, ABS 2004)</p>
Norms – reciprocity	<p>Norms of reciprocity refer to the ways in which acts of one person/group are reciprocated by others (formally or informally). Various types of reciprocity can be identified (e.g. Stone 2001).</p>
Norms - other	<p>As well as norms related to trust and reciprocity, a range of other norms enabling (or disabling) positive social interaction can be identified. For</p>

Component of social capital	Description
	example, ABS (2004) identify norms such as acceptance of diversity, inclusiveness, and the extent to which members of a group have a sense of common purpose.
Networks – types	<p>While norms are the shared expectations of behaviour held within a group or between groups, networks are the processes by which social interaction occurs. Many types of social network exist, and the characteristics of these networks may provide useful insight into the type and nature of social capital available to a particular individual, group or community.</p> <p>Details that may be gathered about social networks as part of a social indicator framework may include the size/scale and geographic location of networks, links between networks, frequency of interaction/exchange within networks, density and openness of membership of networks, transience/mobility of networks, and the power relationships that structure networks (e.g. Stone 2001, ABS 2004).</p>
Networks – participation /transactions	As well as details about the characteristics of networks, it is common to obtain data on the extent of participation in these networks – in other words, on the transactions occurring in social networks. These transactions may include participating in formal or informal social gatherings or meetings, taking on particular roles in groups e.g. as an officer of a social club, taking collective action to solve an issue, sharing knowledge and information, negotiating with others, or applying sanctions (e.g. Putnam 2000, Stone 2001 ABS 2004).

### **3.4. Social indicator framework developed to monitor rural well being and sustainable development**

There are relatively few examples of social indicator frameworks developed as part of ESD monitoring in Australia. There are almost no examples of indicator frameworks designed to examine human dimensions of specific agricultural industries.

However, there are numerous examples of

- sets of social statistics and social indicators used to examine Australian rural regions<sup>3</sup>, which may provide useful lessons for developing social indicators for specific agricultural industries, and
- social indicators developed as part of sets of sustainable development indicators in different countries and regions.

---

<sup>3</sup> Objective social statistics for Australia's rural regions have been constructed by several groups and agencies. Most of these profile socio-demographic characteristics of rural regions. For example, Haberkorn *et al.* (2004) profile socio-demographic changes in Australia's rural regions over 1996 to 2001, including population density, growth, gender, ageing and dependency rates; migration; labour force participation; educational attainment; household and family structure; income and income distribution; housing characteristics and use of computers. This social profile is not, however, based on a framework aimed at measuring overall social well-being, instead drawing on available data to provide more detailed information on social change in rural areas. Similarly, Bray (2000) profiled social characteristics of regional Australia without explicitly relating the social statistics reported to well-being or quality of life of the population. However, many of the data presented in social profiles of Australia's rural regions such as Haberkorn (2004) and Bray (2000) fall within one or more of the categories of common quality of life measures listed in Table 3, and so have been included in this review.

This section reviews social indicator frameworks used to examine rural well being and sustainable development, and compares these to more general social indicator frameworks examining quality of life/social well-being outcomes at a national/international scale.

It is important to emphasise that this literature may have limited usefulness. Social indicator frameworks developed to monitor rural well-being and/or sustainable development have generally been developed to monitor geographically defined regions. This is a very different goal to that of examining the contributions of a specific industry to sustainability, as any single industry will generally be only one of many economic activities occurring in a region at a particular time. As a result, while the framework components identified below provide useful lessons, they do not necessarily translate easily to development of a social indicator framework for measuring contributions of specific industries.

Tables 5, 6, 7 and 8 provide, respectively, an overview of the components commonly included in social indicator frameworks developed to monitor:

- (a) social well-being as part of reporting on the well-being of regions or nations, providing a comparison to the subsequent examples that aim to examine rural well being or social aspects of sustainable development;
- (b) sustainable development and industry contributions to sustainable development<sup>4</sup> in Australia and internationally;
- (c) social statistics on farmers and farming families in Australia; and
- (d) social statistics used to report on Australia's rural regions.

While Tables 5 and 6 provide useful guides to the types of components *recommended* for measuring social dimensions of sustainability, Tables 7 and 8 provide a useful guide to the types of statistics currently *available* for Australia's primary producers and rural communities.

It is clear from Tables 5 to 8 that components commonly used in social indicator frameworks developed to examine sustainable development fall into the following categories:

- Health;
- Education;
- Economic well-being and equity of economic well-being;
- Working conditions;
- Living conditions, particularly housing quality, transport and access to services;

---

<sup>4</sup> Only two cases of industry-specific indicator frameworks were identified, one examining the mining industry (IISD 2002) and the other providing criteria for evaluating outcomes of research and development undertaken by Australia's rural research and development corporations (Chudleigh and Simpson 2000).

- Social capital, defined using various terms including social cohesion; and
- Culture and identity.

These are similar to the categories of social indicators commonly used to examine quality of life in contexts other than that of monitoring sustainability of development (as can be seen by comparing Tables 5 and 6).

The few examples of indicator frameworks aiming to measure contributions of different industries to sustainable development highlight key differences between sets of indicators developed for a *geographic region* and those developed to measure *contributions of an industry*. The key differences are that, for industry-based frameworks:

- Only those indicators that can be linked to an industry are utilised; and
- Different groups on which the industry has impacts are identified, with those directly employed in the industry clearly differentiated from other groups on which the industry has different impacts.

Sets of social statistics and indicators on Australia's rural regions, meanwhile, have tended to focus on reporting socio-demographic statistics, with few or no statistics or indicators relating to social capital and culture. They therefore differ considerably to most frameworks developed to monitor quality of life or sustainability of development.

**Table 5: Examples of social indicator frameworks used to measure social well-being/quality of life nationally and internationally**

<b>Organisation/country</b>	<b>Organisation for Economic Cooperation and Development (OECD)</b>	<b>Europe</b>	<b>Australia</b>	<b>Victoria</b>
Reference	OECD (2006)	European System of Social Indicators (Noll 2002)	ABS (2001)	Victorian Social Benchmarks and Indicators (Institute for Social Research 2000)
Components included in framework				
<b>Access to services, infrastructure (other than health-related)</b>			✓	✓
<b>Culture, leisure, media</b>	✓	✓	✓	✓
<b>Economy/economic resources</b>			✓	✓
<b>Education and learning</b>	✓	✓	✓	✓
<b>Employment (conditions, opportunities)</b>	✓	✓	✓	✓
<b>Environmental quality</b>	✓	✓		✓
<b>Equity/democracy</b>	✓			✓
<b>Government</b>				✓
<b>Health</b>	✓	✓	✓	✓
<b>Housing</b>	✓	✓	✓	✓
<b>Income, consumption, poverty, wealth</b>	✓	✓	✓	✓
<b>Individual</b>			✓	✓
<b>Personal development/total life situation</b>		✓		✓
<b>Population (demographic change)</b>		✓	✓	
<b>Recreation</b>		✓	✓	✓
<b>Security/public safety</b>		✓	✓	✓
<b>Social participation, cohesion (social capital)</b>		✓	✓	✓
<b>Social security</b>		✓		
<b>Social stress</b>	✓			
<b>Statistics on families/particular groups/particular communities</b>			✓	✓
<b>Transportation</b>		✓	✓	✓

**Table 6: Social indicator frameworks used to measure sustainable development in Australia and internationally**

Organisation/country	United Nations	United Kingdom	International/USA	USA	USA mining industry	Australia Rural Research and Development Corporations
Measures sustainability of development (nation/region scale)	✓	✓	✓	✓		
Measures contribution of industry to sustainable development					✓	✓
Reference	UN Commission on Sustainable Development (2001)	UK Sustainable Development Indicators (Sustainable Development Unit 2005)	Hart (1999)	USA Sustainable Development Indicators (1997, 2001)	IISD (2002)	Chudleigh and Simpson (2000)
<b>Social components included in framework</b>						
Access to services, infrastructure		✓		✓	✓	
Economy			✓			
Education and learning	✓	✓	✓	✓		✓
Employment		✓		✓		✓
Environmental quality		✓				
Equity	✓			✓		✓
Government			✓	✓		
Health	✓	✓	✓	✓		
Impacts on wider community e.g. economy, employment, well-being					✓	✓
Housing	✓	✓	✓			
Income and poverty		✓		✓		
Individual				✓		
Population	✓		✓	✓		
Product quality						
Recreation			✓			
Security/public safety	✓	✓	✓			
Social justice		✓				
Social participation, cohesion (social capital)		✓	✓	✓	✓	✓
Social/cultural integrity					✓	
Transportation		✓	✓			

<b>Worker health, safety, well-being</b>					✓	✓
--	--	--	--	--	---	---

**Table 7: Social indicator frameworks and social statistics used to report on Australia’s farmers and farming families**

<b>Region</b>	<b>Australia</b>	<b>Australia</b>	<b>Australia</b>
Reference	Barr <i>et al.</i> (2005)	ABS (2003)	Productivity Commission (2005)
Framework component/indicator			
Age profile of farmers and particular categories of farmers (e.g. those entering/exiting farming)	✓	✓	✓
Change in consumption of agricultural products (e.g. fruits, vegetables) by Australian population			✓
Downstream/indirect employment generated by agricultural sector			✓
Educational attainment by farmers			✓
Estimated value of agricultural operations (and distribution of EVAO), farm establishment GDP, profit/rate of return on investment for farm enterprise		✓	✓
Farm establishment size (area, economic turnover)			✓
Farm family incomes and wealth – on-farm, off-farm, volatility of income; agricultural worker income	✓	✓	✓
Farm family structure		✓	
Gender of farmers and particular categories of farmers (e.g. those entering/exiting farming)	✓	✓	✓
Government assistance to agriculture			✓
Information technology use by farming households (computer and internet use)		✓	✓
Living costs for farmers/farm families			✓
Location of farming families		✓	
National contribution to economy (\$, employment, investment, exports)			✓
Number of farm establishments, rate of aggregation of farm establishments	✓		✓
Number of farmers, number of farming households (farm families)	✓	✓	✓
Productivity			✓
Total direct employment in agricultural sector (may include type of employment e.g. self employed, contractor; skills needs; length, seasonality and volatility of employment)			✓
Work intensity (e.g. average hours worked per week by farmers)		✓	✓
Geography/grouping by which data reported	In the three sources reviewed, while many statistics were reported only as a national total for the agricultural sector, statistics were in several cases provided by broadacre sector (e.g. cropping, grazing, dairy), or at a smaller geographic scale e.g. State.		

**Table 8: Social indicator frameworks and social statistics used to report on Australia's rural and regional communities**

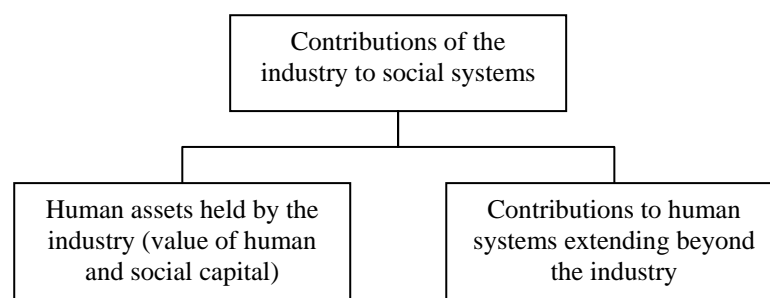
Region	Riverina, NSW	Australia	Australia	Australia	Woody Yalaok Catchment
Reference	WRI (2004)	Haberkm <i>et al.</i> (2004)	Bray (2000)	ABS (2005)	Pepperdine (2000)
Availability of/access to services (e.g. childcare, health, education)			✓	✓	✓
Building approvals	✓				
Community participation (volunteering, attending events)					✓
Computer and internet use	✓	✓		✓	
Consumption (expenditure) by individuals/households					
Demographics of population (e.g. age, gender, fertility, mortality)	✓	✓	✓	✓	✓
Disease/disability incidence				✓	
Education (attainment, access, opportunities, field of)	✓	✓	✓	✓	
Family/household structure		✓	✓	✓	
GDP per capita				✓	
Health expenditure				✓	
Health risk factors (e.g. immunisation rate, alcohol consumption, diet)				✓	
Housing/living arrangements (e.g. type of dwelling, rate of home ownership, affordability of average rent/mortgage payments)		✓	✓	✓	
Incomes (individual, family, income distribution)	✓	✓	✓	✓	
Indigenous population (various statistics on)	✓	✓	✓		
Labour force participation, employment and unemployment (may include statistic describing types of employment, stability of employment, access to employment)	✓	✓	✓	✓	✓
Attachment to area					✓
Language (e.g. fluency in English)		✓			
Life expectancy (at birth, at age 65, disability free)				✓	
Natural resource dependency		✓			
Population (change in total, density)	✓	✓	✓	✓	✓
Population mobility (e.g. migration between regions/nations)		✓	✓	✓	✓
SEIFA indexes		✓	✓	✓	
Social capital (social cohesion, networks, norms, social disintegration)				✓	✓
Welfare dependency		✓	✓	✓	
Geography/grouping by which data reported					

## 4. Social components of the Signposts framework

This section reviews the social components of the Signposts framework. The review begins with examination of the division of social components into stocks and flows, then examines the major subcategories within stocks and flows. Finally the components within each stock and flow subcategory are reviewed. Following this, specific outcomes and indicators for each stock and flow component are discussed in Section 5.

### 4.1. Stocks and flows

The Signposts framework currently conceptualises social contributions of agricultural industries as stocks of capital ‘owned’ by the industry, and flows of social contributions from the industry to human systems that extend beyond the industry, as shown in Figure 1.



**Figure 1: Social components of the framework: stocks and flows**

The division of the social components of the Signposts framework into ‘stocks’ and ‘flows’ is appropriate and justified, as the social impacts of an industry on human assets ‘held’ by the industry are likely to be different to the industry’s impacts on human systems extending beyond the industry.

The two components correlate well to the two broad questions on the Australian definition of ESD.

The argument supporting separate examination of stocks and flows extends beyond the functionally different types of impacts agricultural industries may have on different groups. While in the ‘flows’ component, the issue of interest is how the industry affects groups located outside the industry, for the ‘stocks’ component, achieving ESD requires ongoing maintenance and improvement in the condition of stocks.

It is therefore important to examine the overall condition of the stocks of capital that form the basis of an industry’s activities, *whether or not that condition is a direct result of actions of the industry*. This is because sustaining and improving the overall extent and quality of stocks is an important part of achieving all dimensions of ESD. Therefore the Signposts framework needs to monitor both the condition of the stocks needed to sustain the industry, and the flows that arise as a direct result of the industry’s activities. Examining these as separate categories allows only those flows arising as a direct result of an industry’s activities to be included, while incorporating a more complete understanding of the overall condition of stocks.

The division into stock and flow components also serves to highlight some gaps in the social indicators literature. The majority of literature on social indicators has focussed

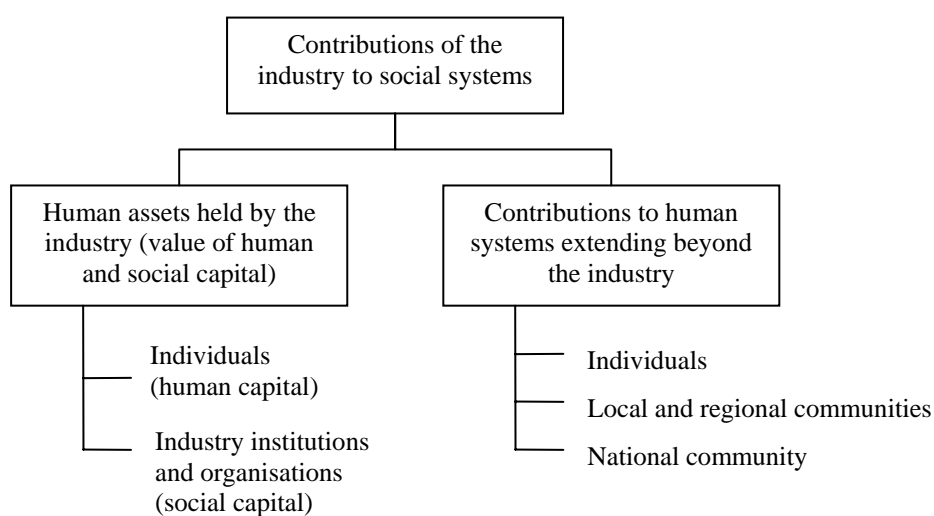
on measuring the quality of life/well-being of a particular human population or group, using objective or subjective social indicators<sup>5</sup>. There is therefore a considerable body of work and practice to guide development of indicators for the ‘stocks’ component of the Signposts framework.

Considerably less literature, however, has examined how to monitor the social contributions of an industry or group to other groups/communities – and so there are considerably fewer existing examples to guide development of appropriate indicators for the ‘flows’ component of the framework.

## 4.2. Categories within ‘stocks’ and ‘flows’

While the distinction between stocks and flows is justifiable and appropriate from a theoretical point of view, identifying which types of social contributions should be included under ‘stocks’ and which under ‘flows’ is in practice challenging. The key question is what constitutes a flow arising from an industry’s activities, versus a stock that is required for the industry to maintain and improve its environmental, economic and social contributions over time.

The current categorisation within stocks and flows identifies stocks as including human and social capital, while flows are conceptualised as contributions of agricultural industries to individuals, local and regional communities, and the national community, as shown in Figure 2.



**Figure 2: Current stock and flow categories of social components of the framework**

### 4.2.1. Distinguishing between stocks and flows

Some general principles need to be established for identifying what is a stock (form of capital) versus a flow, and how categories within stocks and flows should be developed.

Chesson *et al.* (2005) define a stock as something ‘belonging’ to the industry, i.e. as a form of capital. Traditionally, capital is defined in terms of its productive use, in other words as something that can be used to produce goods and services (economic, social or environmental) (see for example Black 2002: 46). Clearly individuals employed in

<sup>5</sup> Almost all articles in the international journal *Social Indicators Research*, for example, focus on this area.

the industry are the primary source of the human capital required by the industry. Similarly the relationships and networks that facilitate communication and action in the industry are the primary source of social capital. However, as well as measuring the change in value of these ‘stocks’, it is also necessary to measure the contributions an industry makes to human and social capital beyond that required for the ongoing functioning of the industry, i.e., the ‘flows’ arising from the industry.

There are practical difficulties identifying the social and human capital embedded in industry institutions and in individual industry members versus contributions to human systems extending beyond the industry.

Specific questions that arise when categorisation into stocks versus flows is attempted include the following.

*1. If someone works in the industry, should their quality of life in its totality be considered a stock, or should impact on quality of life be considered a flow excepting those elements which contribute to industry outcomes?*

Quality of life is a result of multiple factors, one of which is the employment a person is engaged in – for some, an agricultural industry. These multiple factors may include (e.g. Sousa-Poza and Sousa-Poza 2000):

- their individual psychology – which is affected by their employment conditions but also by their personal and social relationships, physical surroundings, and biological determinants;
- the physical and social settings they live in - which may be partly or wholly determined by the industry they work in and the necessity of living in a particular region as a result of that employment;
- their personal relationships – influenced by many factors including work relationships; and
- their income – influenced by their employment in the industry, but also by other factors including income generated by others in their household or inherited wealth. For example, a large proportion of Australian farming families earn a significant percentage of their household income off-farm, with the Productivity Commission (2005) estimating that since 1989-1990 an average of 65% of farm household income has been derived from off-farm sources.

Conversely, some or all aspects of a person’s quality of life outside work-related aspects can influence their work productivity (e.g. Rice *et al.* 1985; Frisch 1998; Koopman *et al.* 2002).

Clearly, some components of the quality of life of those employed in the industry may contribute to their productivity in the industry, while conversely the industry may contribute to quality of life outcomes for its employees have influence the industry; i.e., which do not directly flow back to contribute to industry outcomes. Therefore it is necessary to include individuals employed in the industry as a category under both the ‘stocks’ and ‘flows’ components of the framework.

In practice, similar indicators may be used in some cases for monitoring the conditions of stocks, and flows arising from industry contributions. This is discussed further when specific outcomes and indicators are identified in Section 5.

2. *Should the families of those directly employed in the industry be categorised as stocks or flows?*

Family members may be partially or wholly financially dependent on an agricultural industry, and their quality of life may be significantly influenced by the industry. Some family members may be considered to form part of the stocks contributing to an industry, particularly in many farming families where, while only one member of the family may be defined as ‘working’ in the industry, others contribute significantly through unpaid contributions that are not formally acknowledged.

The presence of significant contributions suggests that the definition of those directly employed in the industry needs to be made broad enough to encompass unpaid contributions to the industry from family members. If this is achieved, then any family members working (paid, unpaid or otherwise) in an agricultural industry will be included as individuals employed in the industry (discussed above), and the remaining impacts of an industry on families of those employed in the industry can be placed in the ‘flows’ component of the framework.

3. *Should those who are indirectly dependent on the industry – via downstream or induced impacts of the economic activity of the industry - be included as a stock or flow?*

Under the current framework, which focuses on production to the ‘farm gate’, impacts on businesses dependent on an agricultural industry beyond the farm gate are best conceptualised as flows. However, any extension of the framework to include downstream activities in the chain of agricultural production will necessitate a revision of the categorisation.

#### **4.2.2. Identifying appropriate subcategories of stocks and flows**

Section 4.2.1 discussed how stocks and flows should be differentiated conceptually. Going beyond the more conceptual issues, it is necessary to identify logical and practical categories of stocks and flows that can be used to structure the development of meaningful social indicators.

Given that the goal of this process is to identify categories which are meaningfully different from each other, the logical approach is to identify types of stocks and flows that are functionally different from each other, and base the sub-categories of stocks and flows on these differences. This was done by identifying different types of stocks contributing to industry outcomes, and groups on which the industry is likely to have different social impacts.

To identify these categories, literature on the social impacts of Australian agricultural industries was reviewed. These analyses generally identify functional differences in types of social impacts which provide a useful basis for identifying functionally different types of stocks and flows. Table 9 summarises the different categories identified.

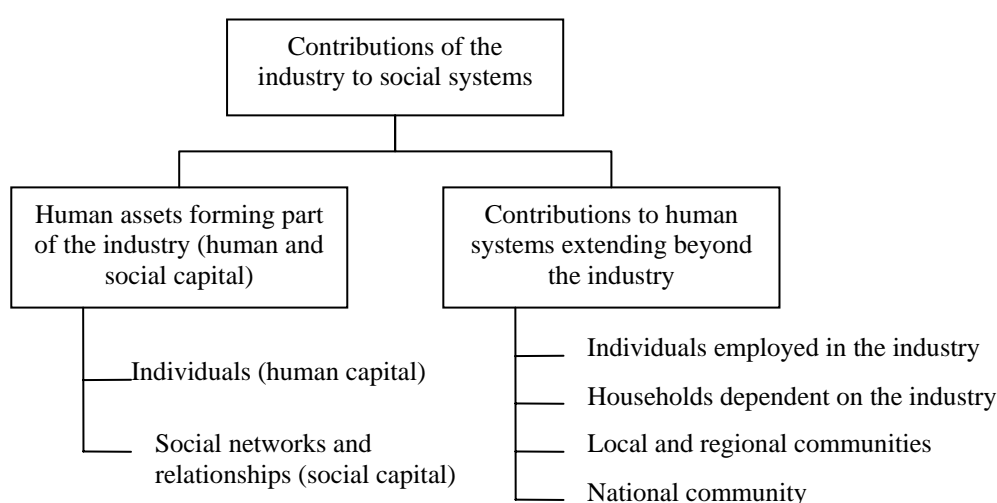
**Table 9: Different types of social impacts of an agricultural industry**

<b>Categories of social impacts (social contributions)</b>	<b>Description</b>	<b>Stock or flow?</b>
Individuals employed in the industry	People who are directly employed in the industry (this may include both paid and unpaid employees). This may	Stock and flow – individuals employed in the industry both contribute to

Categories of social impacts (social contributions)	Description	Stock or flow?
	include people who are part-time employed in the industry while receiving other income from elsewhere. A measure of level of dependence may be required.	the industry and are contributed to by industry
Social capital related to the industry/region	Social networks and relationships generated by and/or flowing on from the operations of the industry	Stock/flow – functionally difficult to distinguish in some cases as the same social network may support industry activities and also provide beneficial flows beyond the industry.
Families dependent on the industry (e.g. families of those employed in industry) [This includes both the individuals and the networks of social interaction – i.e., social capital – generated by family interaction]	Individuals whose lives are partly or wholly dependent on the industry despite not being directly employed in the industry. Includes families/ household members of those employed in the industry.	Flow, although may be considered a stock in terms of how household members may contribute in unacknowledged ways to the productivity of those in the industry.
Upstream and downstream businesses (e.g. suppliers of inputs to agricultural industries, distributors of goods/services to the industry, transport of produce, processing of produce) [Both individuals/groups and social capital supporting these individuals/groups]	Businesses whose operations are partly or wholly dependent on an agricultural industry. While the identification of this group may appear mostly relevant to the ‘economic’ part of the framework, it is important to recognise that individuals and groups employed in these businesses may experience unique social impacts as a result of changes in the industry, due to their high dependence on the industry. They are also culturally linked to the industries they supply or whose produce they transport, process and sell.  Not recommended to be addressed as a separate group as this stage as difficult to separate from ‘local/regional area’ which will incorporate some downstream effects.	Flow which can be incorporated in the ‘local/regional community’ category but may be re-categorised in future as framework is extended beyond the farm gate.
Local/regional area in which industry is located [Both individuals/groups and social capital supporting these individuals/groups]	Many (although not all) of the social and cultural impacts of agricultural industries are captured within the geographic region they are located in. These impacts may include the flow-on indirect employment and spending generated by members of the industry, the present of particular social networks, and various aspects of quality of life in the region e.g. landscape amenity.	Flow
General population (Australian and international)	The sale of products from an agricultural industry has an impact on consumers of those products; the	Flow

Categories of social impacts (social contributions)	Description	Stock or flow?
[Both individuals/groups and social capital]	culture and heritage associated with an industry may also have an impact at national level.	
References: Brooks <i>et al.</i> (2001), Fenton and Marshall (2001), Hassall & Associates <i>et al.</i> 2003, GHD 2005, Schirmer <i>et al.</i> (2005a,b), Schirmer and Pickworth (2005a,b), Synnott Mullholland Management Services P/L (2005). Note that many other examples of SIA can be provided which discuss the different groups on which changes to industries or resource access may have an impact.		

Based on the functional categories identified in Table 9, a set of subcategories of stocks and flows similar to that in the current framework is proposed, shown in Figure 3. Each of the six proposed subcategories is discussed separately in the following sections, with a focus on defining the category further, and identifying appropriate components for each.



**Figure 3: Recommendation for revised categories with stocks and flows**

### 4.2.3. Stocks – human and social capital

The stocks subcategories have been split into ‘human capital’ and ‘social capital’. While some of the more recent discussions of human capital incorporate measures of social capital, distinguishing between the two is useful as a way of identifying those components relating to individuals (human capital) and to groups/networks/interactions (social capital).

#### 4.2.3.1. Individuals (human capital)

##### Defining the scope of ‘Individuals (human capital)’

The first current subcategory under ‘stocks’ is ‘individuals (human capital)’. The use of the term ‘human capital’ fits with the overall conceptualisation of stocks as forms of capital, an approach consistent with the World Bank’s (1997) ‘Multiple Capital Model’ (MCM) in which sustainable development was conceptualised as the ‘maintenance or enhancement of wealth for future generations’ (Noll 2002: 59). Using this definition, natural, produced, human and social capital were identified as the four types of capital contributing to sustainable development (World Bank 1997).

The term ‘human capital’ is generally defined in the international literature as relating to the productive capacity of humans rather than their quality of life or social well-being, as the following definitions demonstrate:

Human capital arises out of any activity able to raise individual worker productivity. (Marshall 1998: 286)

People and their ability to be economically productive. Education, training, and health care can help increase human capital. (Development Education Program of the World Bank 2000)

The human resources used in the economy (Newton *et al.* 2001: 167)

The present discounted value of the additional productivity, over and above the product of unskilled labour, of people with skills and qualifications. Human capital may be acquired through explicit training, or on-the-job experience. (Black 2002: 213-214)

More recently, the Australian Bureau of Statistics (ABS 2004: 13) presented a somewhat broader definition, in which human capital was defined as ‘personal capacity’, incorporating ‘abilities (including health), knowledge and skills, interpersonal skills and intrapersonal skills’.

Utilising a human capital framework to select indicators will not identify how an industry contributes to the overall quality of life of its human ‘stocks’. However, using the definition of ‘human capital’ to identify *who* is dependent on the industry, and then identifying indicators for measuring (a) the ‘condition’ of those working in the industry based on the requirements needed to continue sustainable operation of the industry (stocks), and (b) the ways in which the industry contributes to their total quality of life (flows), does allow for monitoring of social contributions of an industry to ESD.

As discussed earlier, it is difficult to identify whether the quality of life of those employed in an industry (the industry’s ‘stocks’) should be classified as a stock contributing to the industry, or a flow contributed by the industry – or both. There is evidence that quality of life and employment are highly linked. In several studies, those who are happier with their lives in general have been found to have significantly higher levels of job satisfaction than those reporting lower overall well-being (see for example Rice *et al.* 1985; Frisch 1998; Koopman *et al.* 2002; Schirmer and Pickworth 2005a,b).

The relationship between well-being and job satisfaction cannot be split into a unidirectional causal chain of events in which higher job satisfaction leads to higher quality of life or vice versa. However, the presence of the relationship indicates that overall quality of life may have a relationship with job satisfaction and, potentially, job productivity, as productivity has been shown to be related to job satisfaction in several studies (Fang and Luchak 2005).

### **Components of ‘Individuals (human capital)’**

The current Signposts framework specifies the following components of human capital:

- Demography;
- Health; and
- Education.

In most of the literature examining the components needed to maintain and ‘improve’ human capital – in other words, to improve the productive capacity of humans to

achieve output – these three categories have been considered key, with a particular focus on health and education. In recent years, with ageing workforces an issue of increasing interest, the demographic status of those working in an industry has become of increasing interest, particularly for rural industries in many developed countries (see for example Foskey 1998, Majoral and Sanchez-Aguilera 2000, Haberkorn 2002, McMullin and Cooke 2004, Orzechowska-Fischer 2004, ABS 2005, Fraser 2005). When examining health issues, there should be an emphasis on examining both physical and mental health, rather than only one of the two, as both can equally affect productivity in an industry.

The three components currently suggested are therefore appropriate for examining changes in human capital, although health should be specified as incorporating both mental and physical health.

This leaves the question of whether any further components are required to adequately monitor human-capital related ESD outcomes for the industry.

Achieving ESD requires the individuals and groups employed in an agricultural industry to have the skills and resources to sustainably manage the resources utilised to produce industry output. Nelson *et al.* (2005) discuss human resources and capabilities required to achieve improved natural resource management in detail; this issue is discussed further in Section 6. In the context of sustainable development, humans need the skills and resources including the following to achieve ESD:

- Specific knowledge and skills in sustainable resource management practices;
- Access to advice and resources to assist in achieving sustainability, e.g. to experts and extension officers able to provide specialist advice;
- Supportive networks to share knowledge, improve knowledge and act collectively on resource management problems (discussed further in the following section).

Given that the first two dotpoints above relate to either *holding* or *having access to* skills required for sustainable management – and that these skills may be acquired in ways other than via formal education – the category of ‘education’ should be changed to ‘education and skills’ to reflect the skills beyond formal education that may affect productivity and achieving ESD.

#### **4.2.3.2. Social capital**

##### **Defining the scope of social capital**

The definitions provided in Section 3.3.3.2 emphasise that social capital encompasses interactions between humans that allow communication, interaction and joint action. Social capital is an important contributor to job satisfaction and hence to the conditions of human ‘stocks’ that form the basis of an agricultural industry. For example, Requena (2003: 331) found a clear relationship between quality of life at work and social capital, with social capital ‘a better predictor of quality of life at work and job satisfaction than the characteristics of the worker, the company or organization, and the work environment.’

The term ‘social capital’ in the stocks components of the framework is currently defined as involving ‘industry institutions and organisations’. As for previous categories, it is important to identify when social capital is a stock contributing to industry outcomes, versus a flow providing benefit outside the industry. This requires

identifying the types of social capital that serve an agricultural industry and therefore contribute to achieving ESD outcomes (stocks), versus how an agricultural industry contributes to social capital that operates outside the industry (flows).

The use of the term ‘industry institutions and organisations’ implies that an industry requires formal social capital in the form of social networks such as unions, associations or other organisations. However, informal types of social capital can contribute significantly to the output of an industry. Having workplaces in which employees trust each other, for example, can result in higher productivity than is achieved in workplaces where co-workers have little trust in each other. It is the social networks and relationships that service an industry that are of interest in this sub-component, and these may operate beyond industry-specific institutions and organisations.

For this reason, it is recommended that the original ‘Industry institutions and organisations (social capital)’ title be changed to ‘Social networks and relationships (social capital)’, as shown in Figure 3, to reflect the important of informal as well as formal networks.

### **Components of social capital**

The discussion of social capital in Section 3.3.2 highlighted that social capital is generally measured via examining both *norms* and *networks*. Norms are the rules and behaviours governing how people interact, and can generally only be examined by directly surveying the people involved in a group or activity, e.g. in an agricultural industry. Networks can be described based on their *type*, and on the extent and nature of *participation* in networks.

In addition, it is important to recognise that achieving ESD requires particular types of social networks that facilitate learning and acting on shared resource management problems that cannot be addressed by individuals on their own. Therefore it may be important to identify particular types of social networks (e.g. Landcare groups), that provide resources to specifically address NRM issues, as indicators of whether there is adequate capacity to address resource management challenges in an agricultural industry.

The following components of social capital therefore play a significant role in contributing to industry productivity and sustainability:

- Norms (trust, reciprocity)
- Networks (type and participation)

The norms of trust and reciprocity have been incorporated for two reasons. Firstly, they are the most common norms represented in sets of social capital indicators. Secondly, they can have a direct effect on industry outcomes, whereas other norms such as tolerance do not have as clear a relationship with achieve industry-related ESD outcomes.

#### **4.2.4. Flows – individuals, households, local/regional communities and nation**

Before discussing each of the four categories recommended to be included in the ‘flows’ component of the framework (individuals, households, local/regional communities, and national community), it is important to identify the overall

approach that should be used to identify components for the Flows component of the framework.

Conceptually, flows are considerably different to stocks. Whereas the overall condition of stocks was of interest whether or not that condition arose as a direct result of an agricultural industry's activities, only those things which can be demonstrated to result from the industry's activities are of interest when examining flows. In terms of the human components of the framework, the question of interest when examining flows is:

In what ways does an agricultural industry directly contribute to the total quality of life of different groups?

To assist in answering this question, a basic framework for identifying the different ways an industry may contribute to total quality of life is needed. In Section 3.4, the review of common categories of social indicators showed clearly that quality of life indicators almost always fall into the following categories:

- Health;
- Education;
- Economic well-being and equity of economic well-being;
- Working conditions;
- Living conditions;
- Social capital; and
- Culture and identity.

These seven dimensions of quality of life are used as the basis for identifying appropriate components to be included in the individual, household, local/regional community and national subcategories of the flows component of the framework discussed below.

It is not appropriate to use all seven dimensions to measure the social contributions of an agricultural industry for each category of flows. For example, agricultural industries have little if any influence on employment conditions for the national population as a whole, while having a direct influence on those employed in the industry. For this reason, in each of the following sections the seven dimensions are reviewed and those that are relevant to each of the four suggested sub-categories of flows identified. Where a link can be identified between a quality of life dimension and flows from agricultural industries to the group being discussed, it is recommended that this dimension be included as a component.

#### **4.2.4.1. Individuals employed in the industry**

The categorisation 'individuals' currently included in flows is confusing, as it is not clear what groups of individuals are being referred to<sup>6</sup>. Given that the focus of

---

<sup>6</sup> The term 'individuals' may be interpreted as referring to measures of social flows that are reducible to individuals. This is not a meaningful distinction in practice, as most measures of impact at any scale involve some aggregated measures of the properties of a group of individuals, excepting measures of social capital.

subcategories is identifying particular groups to which an agricultural industry makes distinct social contributions, it is important to clearly specify the type of group being referred to.

As a result, the title ‘individuals’ has been changed in Figure 3 to ‘Individuals employed in the industry.’ As discussed earlier, this may include individuals employed part-time, full-time, paid and unpaid.

Components in this subcategory should be selected to meaningfully identify the ways in which an agricultural industry contributes to the total quality of life of those individuals who are employed in the industry.

Current components listed within the category are:

- Self-identity;
- Health; and
- Other lifestyle benefits.

These components do not correspond well to the seven core dimensions of quality of life identified, with the exception of health. Self-identity may be incorporated in the ‘culture’ category, while ‘other lifestyle benefits’ may incorporate aspects of employment and living conditions, and social capital.

The seven dimensions of total quality of life are discussed briefly below to identify if agricultural industries may have a demonstrable impact on employees in each dimension:

- **Health:** The nature of working conditions in an industry can clearly have an impact on the health (mental and physical) of those working in the industry;
- **Education and skills:** Industries may provide education/skills attainment opportunities that have benefits for employees beyond improving their productivity in the industry;
- **Economic well being (including distribution of well being):** Income derived from an agricultural industry, and the structure of earnings related to different jobs within an industry, directly affect economic well-being of employees and therefore have a ‘flow-on’ impact on their overall quality of life;
- **Employment conditions:** Employment conditions for employees in an industry are clearly directly a result of that industry (partially in the case of employees whose work is only partly undertaken in the industry being examined);
- **Living conditions:** Living conditions may be partly determined by the agricultural industry, its location and associated income for employees, and affect employees lives beyond their employment in the industry;
- **Social capital:** The social capital created as a result of an agricultural industry’s activities can contribute to the creation of friendships and support networks which contribute to overall quality of life of the employees of an industry; conversely, changes to an industry may result in a reduction of social connectedness that reduces overall quality of life, e.g. as productivity increases in an industry, the total number of employees in an area may drop, constraining the ability to maintain some social capital;

- **Culture and identity:** Specific cultures may develop in association with a particular industry, and an agricultural industry will be one of the contributors to the development of self-identity in its employees. In most cases, this culture is a product both of particular industries and other social and economic dimensions of a region. The multiple factors that affect culture and heritage make them a ‘public good’ that is difficult to measure, particularly in relation to a single agricultural industry, but the industry is one of the ‘flows’ contributing to cultural development and change.

While not all an individual’s health, education, economic well-being etc. will be a result of the influence of an agricultural industry, in all of these categories there are clear examples of agricultural industries having impacts on the lives of those working in the industry.

Because of this, it is recommended that all seven be included as components of the subcategory ‘Individuals employed in the industry’, and be utilised in place of the three components currently suggested – which are effectively incorporated into and extended on by the seven core dimensions of quality of life.

#### **4.2.4.2. Households dependent on the industry**

The current Signposts framework includes the categories of ‘individuals’, ‘local and regional community’, and ‘national community’ under ‘Flows’. It is recommended that an additional category – households – be added, for two reasons:

- In general, households of those working in the industry are much more directly dependent on the industry than other groups receiving flows of contribution from the industry. Many SIAs specify the families of those employed in an industry as a category of people who may be impacted in unique ways by changes to that industry, further indicating a need to examine families/households as a unique group; and
- The ABS collects data about both individuals and the households they live in, and can provide data on the households of those employed in specified industries from the *Census of Population and Housing*. This makes households a practicable unit of analysis.

People living in the households of, or otherwise dependent on, those working in an agricultural industry receive a flow of social contributions related to the industry despite not being directly employed on it. These flows might include the impacts of, amongst others:

- The level of their contact and interaction with the person working in the industry are determined partly by the hours and nature of that person’s work in the industry;
- The financial returns generated by the person working in the industry, which affect all household members; and
- The culture and social networks associated with the industry, which may partially or wholly determine the culture and social networks of industry members’ households.

Components in this subcategory should be selected to meaningfully identify the ways in which an agricultural industry contributes to the total quality of life of the members of households that are partially or fully dependent on the industry (excluding the

direct employees of the industry, who are incorporated in the ‘individuals’ category discussed in Section 4.2.4.1).

The seven dimensions of total quality of life are discussed briefly below to identify if agricultural industries may have a demonstrable impact on households dependent on the industry in each dimension:

- **Health:** An agricultural industry contributes directly to the health of those living in households dependent on the industry, through (a) wholly or partially determining their household income, (b) wholly or partially directing the location of the household, which in turn determines access to health services; and (c) where a household is located on an agricultural property, household members’ health has the potential to be directly affected by the agricultural activities occurring on the property;
- **Education:** There is a less direct link between an agricultural industry and the educational outcomes of household members dependent on, but not working in, the industry. While the location of the industry and income earned from the industry may partly determine access to educational opportunities by household members in some cases, this is not necessarily the case and is difficult to measure. It is recommended education measures not be included for this component;
- **Economic well being (including distribution of well being):** Income derived from an agricultural industry, and the structure of earnings related to different jobs within an industry, affect economic well-being of household members;
- **Employment conditions:** As this category includes only household members who do not themselves work in the agricultural industry or industries being examined, agricultural industries do not directly determine the working conditions of people in this group. However, the industry may influence employment opportunities for household members, particularly where the industry determines the location of the household – and therefore physical access to particular employment opportunities. However, the availability of employment outside the industry is not a direct social contribution of the industry, and are difficult to measure specifically in relation to this subcategory;
- **Living conditions:** Living conditions of those dependent on employees of the industry may be partly determined by the agricultural industry, its location – particularly the quality and availability of housing in the region - and associated income for employees;
- **Social capital:** An agricultural industry may have a significant influence on the types of social networks and behaviours available to and expected of members of a household in which one or more people are employed in an industry. A simple example would be that a grazier’s family may largely socialise with other families who have members working in the grazing industry. It is common for social networks to be at least partly structured around the employment people are based in. In the case of agricultural industries, their location will also affect access to formal and informal social networks outside the industry;

- **Culture and identity:** As for individuals employed in the industry, specific cultures associated with a particular industry form part of the culture and heritage of all members of households with some level of dependence on the industry. The identity of household members may be strongly influenced by the industry, e.g. for those living on a rural property the experience of living on the property may strongly influence their identity.

Based on the discussion above, it is recommended that five of the seven dimensions of quality of life be included as components of ‘households dependent on the industry’: health, economic well-being, living conditions, social capital and culture and identity.

#### 4.2.4.3. Local and regional community

Local and regional communities may receive many social flows from agricultural industries, via the development of unique cultures, businesses, production chains and communities related to an industry. The subcategory ‘local and regional community’ is consistent with that often used in SIAs of rural industries in Australia, which have examined the social impacts of an industry on surrounding geographic regions separately to its impacts on those working in and dependent on the industry (e.g. Schirmer and Pickworth 2005a,b). Therefore it is recommended this category be retained.

The extent of social contributions by an agricultural industry to a local or regional community will depend on the extent to which the activities of the industry impact on that local/regional area. It is important to identify the extent of dependence of a region on particular agricultural industries (discussed further in Section 5).

Current components within the subcategory of ‘local and regional communities’ are employment, community networks and community heritage. These fit into the quality of life dimensions of employment conditions, social capital, and culture and identity.

The relevance of each of the seven dimensions of quality of life is discussed below:

- **Health:** An industry may impact on local community/region health through any health impacts of its activities. These would usually be through byproducts of the industry such as generation of emissions or pollution. These types of input indicators are already incorporated into environmental components of the framework. An industry may have other indirect impacts on health outcomes – for example, the levels of indirect economic activity generated in a region by the industry will determine income for many in the region and hence ability to access some health services; however, these links are not direct enough to be measured adequately as part of the framework. Therefore it is not recommended that health measures be included in this category;
- **Education:** The education status of a region or community is impacted by many factors. While the presence of an agricultural industry in a region may contribute by providing students for schools from families of employees, clear flows from the industry to education opportunities at a local/regional scale are not evident in existing literature. It is recommended education measures not be included for this component;
- **Economic well being (including distribution of well being):** The economic well-being of a region may be impacted by an agricultural industry, depending

on the extent of regional dependence on that industry. However, while economic well being is demonstrably linked to quality of life for individuals, the same result has not been explored when aggregate trends for a region are examined. Given the diversity of economic well being outcomes likely to exist within a region, and the difficulty to linking contributions of the industry to social outcomes except in a purely economic sense, it is recommended that only measures of employment be examined at the local/regional level. This is discussed below under ‘employment conditions’. An alternative measure might be the economic dependence of a region on a particular industry, but it is expected this would be identifiable from the economic components of the Signposts framework;

- **Employment conditions:** Employment opportunities for those living in local/regional areas with some dependence on a particular industry will be in part determined by the industry, via both direct employment opportunities in the industry and flow-on impacts of employment and spending by the industry in the region;
- **Living conditions:** Living conditions of those living in a local/regional area are unlikely to be a direct social contribution of an agricultural industry operating in the region, and it is recommended they not be included as a measure in this subcategory;
- **Social capital:** The social networks and relationships within a region are likely to be partly influenced by an agricultural industry. However, it is difficult to measure this except through the indicators already suggested for other categories of the framework; and
- **Culture and identity:** Specific cultures developed in association with a particular industry form part of the culture and heritage of local/regional areas in which the industry operates.

Based on the discussion above, it is recommended that three dimensions of quality of life - employment conditions, social capital and culture and identity – be included as components of this category. These correspond to the three current components of employment, community networks and community heritage.

#### 4.2.4.4. National community

An agricultural industry may make important social contributions at the national scale, as well as at an individual, household and local/regional scale. Agricultural produce is consumed by virtually every person in the country as well as by consumers internationally, and traditional agriculture forms a significant part of Australia’s cultural heritage.

Current components within the subcategory of ‘national community’ are public health and national identity, which fit into two of the seven dimensions of quality of life discussed below:

- **Health:** An agricultural industry may impact on national health through any health impacts related to use or consumption of its products, or related to byproducts generated by the industry in the process of producing its goods (e.g. carbon dioxide or methane emissions). The latter are measured as input indicators as part of the environmental components of the framework. Health

impacts related to consumption of agriculture produce, however, are social contributions not measured in other parts of the Signposts framework;

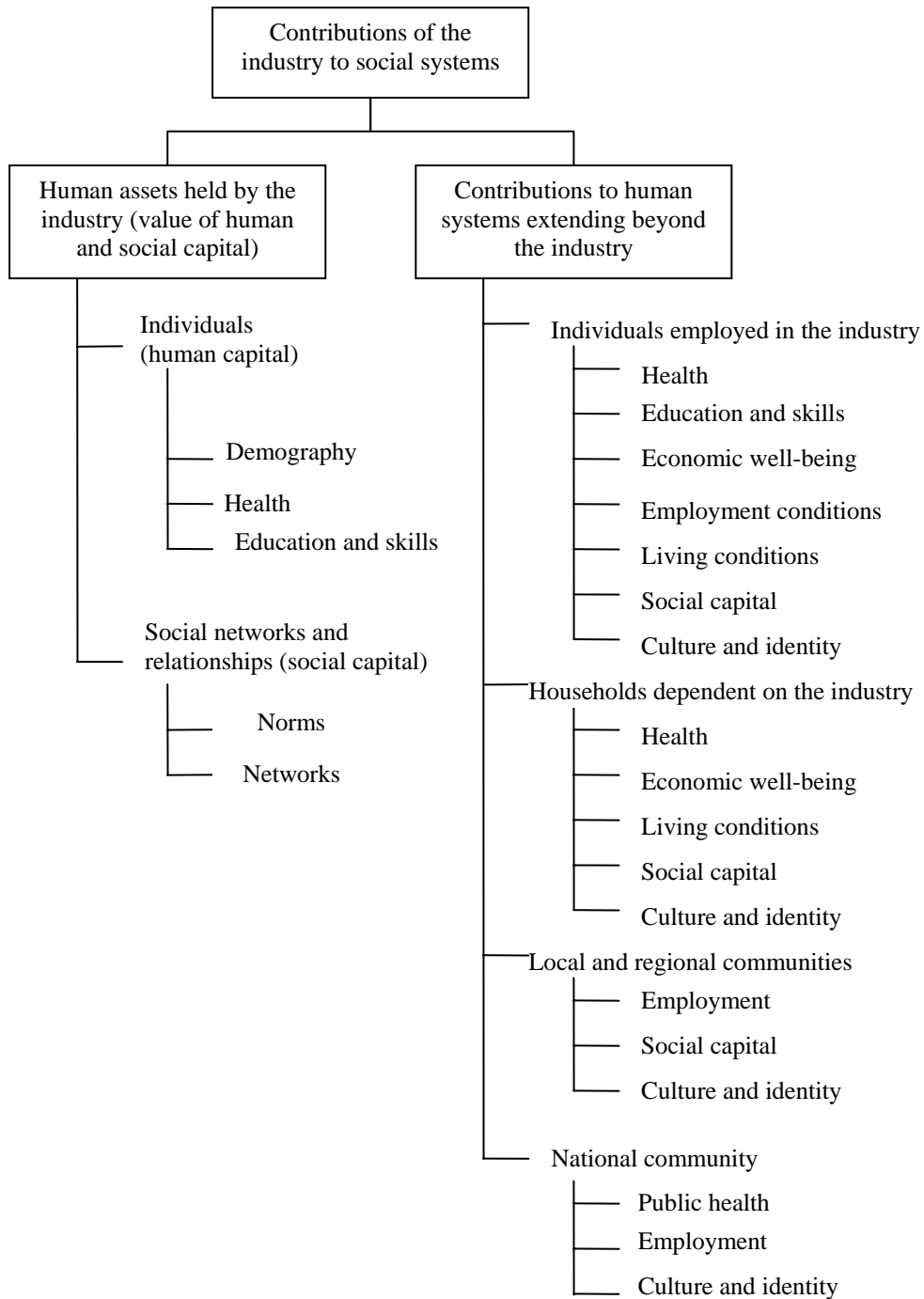
- **Education:** For the same reasons given for other categories of flows, it is recommended education measures not be included for this component;
- **Economic well being (including distribution of well being):** The aggregate economic well being of the nation is clearly impacted by the contributions of different industries. This is already incorporated in terms of dollar value as part of the economic components of the framework and so should not be included in the social components, other than to acknowledge that these economic flows have social impacts;
- **Employment conditions:** The level of employment in an agricultural industry at a national scale, and changes in this over time, represent an important social contribution of the industry;
- **Living conditions:** Living conditions at a national scale are unlikely to be related to particular agricultural industries, and it is recommended they not be included as a measure in this subcategory;
- **Social capital:** Some social networks and relationships at a national scale may be partly influenced by an agricultural industry, but it is difficult to measure this except through the indicators already suggested; and
- **Culture and identity:** Australia's national identity is clearly influenced by different agricultural industries, with this heritage and identity an important social contribution of agricultural industries.

Based on the discussion above, it is recommended that three dimensions of quality of life – health, employment conditions, and culture and identity – be included as components of this category. These correspond to the two current components of public health and national identity, while adding a third – employment measured at a national, rather than an individual or local/regional scale.

### **4.3. Revised social components**

Figure 4 shows the revised social components of the Signposts framework. These form a relatively long list; however, it may be possible to collapse this. For example, in the flows component, the category 'culture and identity' is included for every type of group. This should be incorporated only once if specific and meaningful indicators cannot be identified for each of the groups.

Specific outcomes and indicators are recommended for each component in Section 5.



**Figure 4: Recommended revised social components of the Signposts framework**

## 5. Recommended outcomes and potential indicators for framework components

This section identifies desired outcomes and potential indicators for each of the framework components identified in Section 4.

The extent to which specific indicators are explored is limited. It is possible to identify considerable detail on the advantages and limitations of utilising any individual indicator, but the scope of this review does not allow in-depth exploration of each specific indicator that could be utilised as part of the social components of the Signposts framework. Instead, this section focuses on:

- Identifying appropriate goals, or outcomes, desired for each component;
- Identifying typical indicators used in other indicator frameworks to identify progress towards the desired outcome – or, where no ‘typical’ indicators could be found, identifying potentially useful indicators;
- Identifying the extent to which data is currently available for each indicator.

Before discussing outcomes and potential indicators, a brief review of the methodology used to develop recommendations for outcomes and indicators is presented, focussing on discussing key challenges in developing appropriate social indicators.

### 5.1. Indicator development – methodological issues

#### 5.1.1. Types of social indicator

Social indicators may take various forms, with common categorisations summarised in Appendix 1. Perhaps the most common distinction made in social indicators literature is between *objective* and *subjective* indicators.

Objective indicators measure attributes of a population observable by those external to a population – i.e., without surveying the attitudes or views of that population. Subjective indicators, however, measure personal/individual feelings, beliefs, values and judgments, and can only be identified through directly asking members of a population about those feelings, beliefs etc. (Carley 1981, Miles 1985, Michalos 2004).

A distinct body of research has developed around each type of indicator. Almost all currently available Australian social statistics (from which indicators may be developed) would fall into the category of objective indicators, with surveys likely to be required if subjective indicators are used as part of the Signposts framework. However, there is an increasing shift to undertaking national surveys examining the subjective well-being of a population, such as the Australian Unity Well-being Index (Cummins *et al.* 2003).

International indices of human well-being such as the Human Development Index have typically used objective social indicators (Lind 2004, Kenny 2005), but there has been a shift in recent years to combining the use of objective and subjective social indicators to better understand and measure social well-being/quality of life (Abrams 1976). In particular, the use of studies of subjective perceptions has provided a

framework by which objective indicators can be validated and the extent to which they explain social outcomes statistically analysed (e.g. Abrams 1976).

### 5.1.2. Criteria for selecting indicators

Some key challenges affect development of social indicators. Of these, the two that are most prominent are:

- Multiple meanings. Many indicators may meaningfully measure more than one aspect of quality of life or social capital. For example, when reviewing the OECD's 2001 social indicators, Kalimo (2005; 220) found that 'within each indicator subset ... the indicators have at least a moderate relationship with more than one' of the social dimensions the OECD aimed to monitor. This can be useful in that it may allow a relatively small set of indicators to be identified that have meaning for multiple dimensions of quality of life<sup>7</sup>;
- Data limitations: A lack of available time series data is perhaps the greatest challenge to development of implementable social indicators (Yli-Viikari *et al.* 2002, Kalimo 2005). Worldwide, the lack of data at scales smaller than nations/states is well recognised as limiting the extent to which local or regional – or, in this case, industry – scale social indicators can be successfully measured (e.g. Bobbitt *et al.* 2005). In this review, 'ideal' indicators are identified, followed by identification of indicators that may be measurable in practice.

Many authors have developed criteria for the design of social indicators. Commonly used criteria are set out below, and were used to guide selection of appropriate indicators for this review.

Social indicators should (OECD 1976; Carley 1981; Booysen 2002; Bobbitt *et al.* 2005):

- be demonstrably linked to some aspect of quality of life/individual and social well-being that can be related to the agricultural industry being examined. Where a direct link cannot be proven between the measured (indicator) and unmeasured (the underlying concept the indicator is argued to represent), then precedents in social indicator development should be followed to select appropriate indicators;
- be understandable to the general public;
- have available time series data which are reliable (i.e., able to be measured in a comparable way over time and at a particular point in time) and valid (measuring the things intended to be measured);
- be comparable across agricultural industries as far as possible;
- have an agreed interpretation – for example, an increase or a decrease in the value of an indicator over time is agreed to represent a positive or negative change; and
- be based on data from credible sources.

---

<sup>7</sup> The problem of multiple meanings is more problematic when different measures are aggregated into a single index meant to represent an underlying concept. As the Signposts framework does not propose to do this, this issue is not discussed.

### 5.1.3. Validation of indicators

Ideally, the selection of appropriate indicators should be based on studies which explore the validity of individual indicators – in other words, whether they measure the things they are intended to measure. One method of validating objective indicators is to undertake time series studies of subjective perceptions of well-being and correlate these with objective indicators about the same population. This allows identification of whether particular objective indicators do in fact meaningfully explain some part of the quality of life/well being of people forming part of a particular population.

For this report, it was not possible to undertake this type of validation. There are no studies available for Australia’s agricultural industries which provide the types of information required to validate specific indicators.

As a result, the indicators discussed below are based on a review of current practice in development of social indicators for sustainable development. While they present a useful starting point, their applicability in the context of Australia’s agricultural industries requires further study, preferably through direct survey/s of participants in particular agricultural industries that can be used to identify the extent to which different indicators explain quality of life/well being outcomes.

## 5.2. Outcomes and indicators for social components of the Signposts framework

Specific outcomes and potential indicators for each two ‘stocks’ and four ‘flows’ subcategories are reviewed in Sections 5.2.1 to 5.2.6 below. The ‘stocks’ indicators suggested aim to measure the condition of stocks, no matter whether the industry is primarily responsible for that condition. This is because the condition of stocks is a key determinant of industry outcomes. Flow indicators, meanwhile, aim to measure only those quality of life outcomes that can be shown to be a direct result of an agricultural industry’s activities.

### 5.2.1. Stocks – Individuals (human capital)

The goals of the ESD framework related to human capital should be to maintain and improve the health and education/skills of, and identify appropriate demographic goals for, the workforce of different agricultural industries. These three areas are key to ensuring those working in agricultural industries are able to contribute effectively to industry-based ESD outcomes over time.

Table 10 provides details of recommended outcomes of and potential indicators for the different components of human capital.

**Table 10: Outcomes and potential indicators for components in the individuals (human capital) category**

Component	Desired outcome/s	Potential indicators	Data source/s*	Key issues/limitations
Health	Maintain and improve health of those working in agricultural industries	Work related accident and injury rate (output indicator)	National Occupational Health and Safety Commission	Accidents/ injuries often under-reported
		Average working hours (input indicator shown to	ABS <i>Census of Population and Housing</i> and ABS	Robustness of data lessens with examination of

Component	Desired outcome/s	Potential indicators	Data source/s*	Key issues/ limitations
		affect stress, physical health)	<i>Labour Force Survey</i>	smaller scale regions.
		Access to health services (input indicator) for employees – can be measured based on average distance to different types of health services if location of employees known	Range of sources and methods of measurement are available – sources need to be further compared for cost and replicability over time	Comparable time series data may be difficult to generate
		Rate of incidence of disease and injury in industry employees compared to national average for comparable age/gender groups	See above	Requires specialist analysis
		Healthy life expectancy of employees in industry compared to national average for comparable age/gender groups	See above	Requires specialist analysis
Education and skills	Ensure workforce is appropriately skilled and can adapt to changing work requirements and environment	Highest formal education level achieved (broad output indicator)	<i>ABS Census of Population and Housing</i>	Formal education as measured in Census does not necessarily reflect skills of workforce
		Access to/utilisation of skills/training opportunities relevant to industry (input indicator)	Further indicator development requires identification of specific skills needs in consultation with agricultural industries. May require survey of members of industry.	
		Access to/utilisation of skills in form of advice from experts/specialists	Further indicator development requires identification of specific skills needs in consultation with agricultural industries. May require survey of members of industry	
Demographics	Sustainable age and gender profile in the workforce of the industry.  Note that further work is needed to adequately specify what	Age profile (% of workforce falling into different age groups)	<i>ABS Census of Population and Housing</i>	ABS data may undercount employment in form of unpaid contributions from family members
		Gender (% of workforce that is male and female by type of	<i>ABS Census of Population and Housing; ABS</i>	See above

Component	Desired outcome/s	Potential indicators	Data source/s*	Key issues/limitations
	would constitute a sustainable demographic profile for the workforce of agricultural industries.	employment)	<i>Labour Force Survey</i>	
		Median age of workforce	<i>ABS Census of Population and Housing; ABS Labour Force Survey</i>	See above
		Average age on entering/exiting industry	<i>ABS Census of Population and Housing</i>	Methodological limitations may limit usefulness of data; see Barr <i>et al.</i> (2005) for discussion
* Note that data availability refers to whether data are available that can be analysed to provide useful indicators. In most cases, considerable analysis of data from the sources listed would be required to produce data for specific agricultural industries. In the case of ABS data, information can be provided for agricultural industries to the 4-digit ANSZIC level, which includes the categories specified in Appendix 2, but may not always be able to be analysed at this level for a range of reasons relating to the validity, reliability, confidentiality and comparability over time of data.				

### 5.2.1.1. Health

A range of indicators may be used to examine or predict health outcomes. Many health indices include measures of both physical and mental health, and of predictors of health outcomes such as social networks, stress levels, self esteem and type of employment (e.g. Michalos 2004).

Outcome health indicators include surveys of people's subjective perceptions of their own health and their satisfaction with it, and objective statistics on life expectancy, incidence of disease and accidents. Various sources of objective statistics can be utilised to monitor health outcomes for employees of agricultural industries over time, including those listed in Table 10.

Input indicators are somewhat more problematic, as changes in measures such as numbers of doctors or provision of health services per head of population may not necessarily change health outcomes. There are similar challenges with process indicators such as numbers of visits to health professionals (see Michalos 2004 for discussion of these issues). A key indicator that has been found to be associated with difference in health outcomes is access to health services, as measured by physical distance; this has been included in Table 10.

### 5.2.1.2. Education and skills

The most common indicator used to measure education and skills outcomes is the highest level of formal education a person has attained. However, the meaningfulness of this indicator is questionable. Having a high level of formal education does not necessarily mean a person working in an agricultural industry has the skills needed to work effectively in the industry. For example, a person with a doctorate in English literature would be considered to have high educational attainment, but may have poor skills as an employee in an agricultural industry.

Many skills utilised in primary production are not learned through formal education. In addition, skills availability is different to skills attainment by individuals – in an increasingly specialised workforce, it is not expected that one person will have all the skills necessary to manage an agricultural enterprise; instead, that person may access skilled expertise in particular areas through contracting individuals or businesses with the skills required to undertake particular tasks.

It is therefore recommended that further work be undertaken to identify the types of skills required in specific agricultural industries to achieve ESD outcomes, and to identify indicators of skills attainment with specific relevance to each industry.

### **5.2.1.3. Demographics**

Ageing of the farmer population is commonly cited as a key challenge facing Australia's agricultural industries. Clearly, a sustainable demographic profile is important to achieving ESD, as with no new people entering the workforce an agricultural industry will cease to exist, while loss of older, highly skilled workers may lead to loss of key knowledge and skills from the industry.

Key concerns that appear typically associated with discussion of ageing in rural areas are (Foskey 1998, Majoral and Sanchez-Aguilera 2000, Haberkorn 2002, McMullin and Cooke 2004, Orzechowska-Fischer 2004, ABS 2005, Fraser 2005):

- Concerns that rising median age of farmers means there are too few young farmers, and too few new recruits entering the farming workforce;
- Concerns about loss of skills with too few young people entering the workforce;
- Concerns about labour shortages in the agricultural sector; and
- Concerns over health and safety issues associated with older workers remaining in the agricultural sector.

Common indicators suggested or used for monitoring the changing age of the workforce are (see for example ABS 2003; Barr *et al.* 2005; Productivity Commission 2005):

- the median age of people in the workforce over time (e.g. average age of farmers)
- average age of those entering the workforce (e.g. of people entering farming)
- average age of those exiting the workforce (e.g. of people exiting farming)
- age profile, or distribution of a workforce (e.g. the number of people between the ages of 21-25, 26-30, 31-35 and so on).

While these indicators are commonly utilised, and most public commentators express considerable concern about the consequences of an ageing workforce, available research does not allow identification of appropriate thresholds that may be considered to represent an 'improving' or 'worsening' age profile of an agricultural industry. This is a key gap in current knowledge that reduces the usefulness of these indicators.

For indicators such as median age to become more useful, it will be necessary to identify the age profile – or range of age profiles – that are compatible with sustainable recruitment into, and exit out of, agricultural industries in Australia.

This requires knowledge not just of the current workforce requirements of an industry, but also of how changing productivity is likely to affect workforce needs – in terms of both the number of workers and the skills those workers will require – into the future.

### 5.2.2. Stocks - Social networks and relationships (social capital)

The key goal for the social capital subcategory of the stocks component of the framework is to maintain or increase stocks of industry-related social capital over time. This requires maintaining or improving the norms and networks that enable ongoing functioning of the industry.

There is very little literature on developing indicators of social capital that contributes to specific industries. Appendix A2 provides a brief overview of common social capital indicators used across a variety of contexts. In the absence of more specific literature examining indicators for monitoring the social capital required by an industry, Appendix 2 was drawn on to identify appropriate outcomes and indicators. These are detailed in Table 11.

**Table 11: Outcomes and potential indicators for components in the social capital category**

Component	Desired outcome/s	Potential indicators	Data availability and source/s	Key issues/ limitations
Norms (trust)	High degree of trust in workplace enables cooperation that supports industry productivity and sustainability	Extent of trust <i>within</i> industry e.g. between industry members	Exact indicator specification requires direct consultation with industry	Direct survey requires careful design and needs to be delivered regularly in a comparable way to identify changes over time
		Extent of trust between industry and groups/organisations outside industry	Monitoring indicators would generally require direct survey of industry participants	
Norms (reciprocity)	Norms of reciprocity allow effective and efficient relationships supporting industry productivity and sustainability	Extent of reciprocation for key activities. E.g. for landcare related activities, this may involve identifying the number of jointly undertaken activities involving industry members.	Exact indicator specification requires direct consultation with industry  Monitoring indicators would generally require direct survey of industry participants	Direct survey requires careful design and needs to be delivered regularly in a comparable way to identify changes over time
Networks (type)	Social networks utilised by industry members enable effective communication and interaction	Number of industry related institutions and organisations*	Data likely to be available from industry -based organisations for both indicators.	Some organisations do not maintain accurate membership databases.  Excludes informal networks that may provide considerable social capital.
		Number of branches and members of industry institutions and organisations		

Component	Desired outcome/s	Potential indicators	Data availability and source/s	Key issues/ limitations
Networks (participation)	Industry members participate effectively in industry networks	Proportion of industry employees with formal membership in one or more industry related institutions and organisations	Combining ABS data on number of employees with information on total membership may provide useful indicator.	Care is needed to ensure different sources of data produce meaningful indicator when data analysed in this way.
		Proportion of industry employees actively participating in institutions/ organisations (may be measured via number of meetings attended or other appropriate measures)	Requires direct survey of institutions/ organisations and/or industry members	Direct survey requires careful design and needs to be delivered regularly in a comparable way to identify changes over time
		Extent of communication between different industry institutions and organisations	Requires direct survey of institutions/ organisations and /or industry members	Direct survey requires careful design and needs to be delivered regularly in a comparable way to identify changes over time
		Average working hours (input indicator which affects ability to participate in institutions/organisations)	ABS <i>Census of Population and Housing</i> and ABS <i>Labour Force Survey</i>	Robustness of data lessens with examination of smaller scale regions. Requires careful validation to identify if increase in working hours correlates with reduced capacity to take part in industry-related networks and interactions.
* Industry related institutions and organisations may include not just organisations which represent members of an industry, but also institutions which industry members take part in, such as Landcare groups, which provide beneficial outcomes.				

The key issue evident from Table 11 is that most commonly accepted measures of social capital available to an identified group/sector such as an agricultural industry require direct survey of industry participants. There is little if any available data other than broad statistics on number and membership of formal industry organisations which may be available from those organisations. However, data on membership numbers does not provide an indication of whether members are utilising these organisations – in other words, whether the presence of these networks is enabling interaction and shared activity amongst industry members.

### 5.2.3. Flows - Individuals employed in the industry

As stated earlier, the focus of indicators in the flows component of the framework is to identify quality of life outcomes arising directly from activities of agricultural industries.

Table 12 presents suggested outcomes and indicators for the category of ‘individuals employed in the industry’. A key issue is that for some categories it is not possible to recommend specific indicators without direct consultation with and information about specific agricultural industries.

**Table 12: Outcomes and potential indicators for components of quality of life of individuals employed in the industry (flows)**

Component	Desired outcome/s (social goals industry aims to achieve for those working in the industry)	Potential indicators	Data availability and sources	Key issues/ limitations
Health	Safe working environment – physical and psychological – provided by industry	Work related accident rate (output indicator)	As for Table 10	As for Table 10
		Average working hours (input indicator shown to affect stress, physical health)	As for Table 10	As for Table 10
		Access to health services	As for Table 10	As for Table 10; additionally, the extent to which the industry limits the residence of employees is only one factors amongst several determining access to health services
	Other health indicators are problematic, as rates of incidence of mental and physical health problems often cannot be attributed directly to the activities of a particular industry.			
Education and skills	Opportunities for education and skills attainment provided by industry	Change in level of formal education attained by industry members over time	<i>ABS Census of Population and Housing</i>	Difficult to identify if change over time is a direct result of industry activities
		Measure of education and skills attainment opportunities provided by industry	Indicator/s need to be developed in consultation with industry	Need comparable measure of different skills/ training opportunities

<b>Component</b>	<b>Desired outcome/s (social goals industry aims to achieve for those working in the industry)</b>	<b>Potential indicators</b>	<b>Data availability and sources</b>	<b>Key issues/limitations</b>
Economic well-being	All individual workers earning income above poverty line	Proportion of workers earning individual income above/below poverty line (output indicator)	ABS <i>Census of Population and Housing</i> and ABS <i>Agricultural Census</i> data can be utilised to calculate this	ABS data may under-represent some types of agricultural workers
		Income distribution measure (Gini coefficient or similar)	As above	Before using this indicator, examination is needed of whether an uneven distribution of income amongst employees has quality of life implications is needed.
		Income variability over time (e.g. % monthly variation over one year, % annual variation over time)	Some data on annual variation available from <i>ABS Agricultural Survey</i> and <i>Agricultural Census</i>	Need to carefully design indicator to identify how fluctuations in income may affect economic well-being and hence quality of life
Employment conditions	Safe working environment – physical and psychological	As for health	As for health	As for health
Living conditions	Industry provides livelihood sufficient to allow maintenance/improvement in living conditions of employees	Living conditions of industry employees compared to national/regional averages	Socio-Economic Index for Areas (SEIFA) Economic resources index provides measure of standard of living; data may be obtained for members of an ANZSIC industry and compared to relevant averages	Extent to which industry contributes to living conditions requires further specification
Social capital	Further work on the influence of agricultural industries on access to social capital is required before meaningful outcomes and indicators beyond those already detailed in Table 11 can be developed. In particular, information is needed on the extent to which social networks operating for purposes other than contributing to the industry are formed and operate as a result of the presence of the industry. Any indicators are likely to require direct survey of industry members.			
Culture and identity	Maintenance of valued culture and	Meaningful indicators need to be developed in consultation with agricultural industries, to identify the types of culture/identity associated with the industry, and the values attached to this		

Component	Desired outcome/s (social goals industry aims to achieve for those working in the industry)	Potential indicators	Data availability and sources	Key issues/ limitations
	heritage associated with industry; positive cultural and identity change	culture/identity.		

#### 5.2.4. Flows - Households dependent on the industry

The goal of social indicators for households dependent on the industry should be to monitor those aspects of quality of life of these households that are contributed to by agricultural industries.

Table 13 presents suggested outcomes and indicators for the category of ‘individuals employed in the industry’. For many, the suggested indicator topics are the same as those presented in Table 12 for individuals employed in the industry. The difference is that for this category, data would be analysed at the *household*, rather than *individual*, level.

A key issue is that, for all of the suggested indicators, the extent to which the agricultural industry contributes to a household depends on the extent to which that household is financially dependent on the agricultural industry.

Therefore, some measure of dependence would be useful. It may be possible to utilise data from the ABARE *Farm Survey* or ABS *Agricultural Census* to identify the extent of dependence of a household on income from a particular agricultural industry. However, going beyond this to correlate levels of dependence with quality of life outcomes is considerably more difficult and may not be possible unless additional questions were incorporated into the ABARE *Farm Survey* or the ABS *Agricultural Census*.

**Table 13: Outcomes and potential indicators for households dependent on the industry (flows)**

Component	Desired outcome/s	Potential indicators	Data availability and sources	Key issues/ limitations
Health	Members of households dependent on the industry have adequate access to health services	Access to health services	As for Table 10	As for Table 10; note that the extent to which the industry limits the residence of employees is only one factor amongst several that may determine access to health services

Component	Desired outcome/s	Potential indicators	Data availability and sources	Key issues/ limitations
Economic well-being	All households have access to income above poverty line; rising real household income over time	Average proportion of household income from agricultural industry; distribution of households with difference levels of dependence on industry	ABARE <i>Farm Survey</i>  <i>ABS Census of Population and Housing</i> and <i>ABS Agricultural Census and Survey</i>	ABARE and ABS surveys collect data more regularly than the ABS Censuses
		Proportion of households with income above/below poverty line (output indicator)	<i>ABS Census of Population and Housing</i> and <i>ABS Agricultural Census</i>	As for Table 12
		Income distribution measure (Gini coefficient or similar)	As above	Before using this indicator, examination is needed of whether an uneven distribution of income amongst employees has quality of life implications
		Household income variability over time (e.g. % monthly variation over one year, % annual variation over time)	Some data on annual variation available from <i>ABS Agricultural Survey</i> and <i>Agricultural Census</i>	Need to carefully design indicator to identify how fluctuations in household income may affect economic well-being and hence quality of life, and to identify contribution of agricultural industry to household income
Living conditions	Availability of appropriate housing and services in regions where industry is located	As for Table 12, but SEIFA index required at household, rather than individual, scale.	Socio-Economic Index for Areas (SEIFA) Economic resources index provides measure of standard of living; data can be obtained for households with one or more members employed in an ANZSIC industry and compared to relevant averages	Extent to which industry contributes to living conditions requires further specification
Culture	Maintenance of	As for Table 12		

Component	Desired outcome/s	Potential indicators	Data availability and sources	Key issues/ limitations
	valued culture and heritage associated with industry; positive cultural change			
Social capital	Maintenance of and improvement in social capital that is generated wholly or partly as a result of the industry's activities	As for Table 12		

### 5.2.5. Local and regional communities

Similar to households, the goal of social indicators should be to monitor those aspects of quality of life of local and regional communities that are contributed to by agricultural industries.

The extent of social contributions of an agricultural industry to a local or regional community will depend on the extent to which the activities of the industry impact on that local/regional area. The set of indicators recommended therefore includes two stages:

- Identifying which regions are more or less dependent on a particular industry, based on measures such as proportion of local value of production based on that industry, and/or proportion of employment in the region that is dependent on the industry;
- Once dependent regions have been identified, utilising such as those discussed in Table 14 to identify how the industry is contributing to those regions with high dependence.

**Table 14: Outcomes and potential indicators for local/regional communities (flows)**

Component	Desired outcomes	Potential indicators	Data availability and sources	Key issues/ limitations
Employment conditions	Changes in industry activity have positive impact on overall employment availability in region	% of regional employment derived from agricultural industry	ABS <i>Census of Population and Housing</i> , ABS <i>Labour Force Survey</i>	ABS cannot always provide data for small regions, particularly from <i>Labour Force Survey</i>
		Change in regional dependence on industry over defined period of time (based on change in % of regional employment and analysis of extent to which change reflects shifts in industry versus shifts in other factors)	As above	As above

Component	Desired outcomes	Potential indicators	Data availability and sources	Key issues/ limitations
		such as size of labour force and availability of other employment opportunities)		
Culture	Maintenance of valued culture and heritage associated with industry; positive cultural change	As for Tables 12 and 13		
Social capital	Maintenance of and improvement in social capital that is generated wholly or partly as a result of the industry's activities – utilise measures discussed under stocks	As for Tables 12 and 13		

### 5.2.6. National community

Similarly to the previous categories, the goal of social indicators should be to monitor changes in those aspects of quality of life of the national community that are contributed to by agricultural industries.

Table 15 provides an overview of key outcomes and indicators for the three components identified under 'national community'.

**Table 15: Outcomes and indicators for national community (flows)**

Component	Desired outcome/s	Potential indicators	Data availability and sources	Key issues/ limitations
Health	Agricultural industry produces safe food products for consumers	Incidence of food poisoning/ contamination associated with specific products	Data sources should be discussed in consultation with Food Standards Australia New Zealand (FSANZ)	As Signposts currently stops at the 'farm gate', the way in which processing of food (which contributes to food safety outcomes) is included in indicator framework requires further examination.
	Agricultural industry produces contributes to maintenance and improvement in health of the national population			
		Rate of compliance with food production standards as specified by FSANZ	Requires discussion with FSANZ	
		Indicators of consumer health	Discuss with FSANZ	

Component	Desired outcome/s	Potential indicators	Data availability and sources	Key issues/ limitations
		require development for specific agricultural industries and their produce		
Employment conditions	Changes in industry activity contribute to positive employment changes at national level	Total level of employment generated by industry nationally	ABS; data may also be available from other sources such as regular industry survey	Need to ensure data source/s utilised are comparable over time
		Direction of change in level and type of employment over time compared to national trends	ABS <i>Census of Population and Housing</i> ; ABS <i>Labour Force Survey</i>	As above
Culture	Maintenance of valued culture and heritage associated with industry; positive cultural change	As for Tables 12, 13, 14		

## 6. Linkages with other dimensions of the Signposts framework

This report has focussed on developing indicators that can usefully represent social aspects of ESD. However, some frameworks developed to monitor sustainable development have taken a different approach to developing social indicators, assuming that rather than ESD involving specific social outcomes, the ways human systems contribute to ecological outcomes should be focussed on. For example, when developing agri-environmental and rural development indicators, Yli-Viikari *et al.* (2002: 23) argue that:

The relevant question as regards the socio-cultural sustainability of agriculture is *the society's ability to manage the use of the natural resources*. (emphasis in original)

Similarly, the Environmental Sustainability Index developed by the Yale Center for Environmental Law and Policy in collaboration with the World Economic Forum and European Commission, focuses on human systems in terms of how they are affected by and affect environmental outcomes:

A country is more likely to be environmentally sustainable to the extent that people and social systems are not vulnerable to environmental disturbances .... [and] .... The extent that it has in place institutions and underlying social patterns of skills, attitudes and networks that foster effective responses to environmental challenges. (Esty *et al.* 2005: 11)

While the Australian definition of ESD clearly conceptualises human dimensions as going beyond achieving sustainable use of natural resources and incorporating achieving improvement in total quality of life, the focus of authors such as Yli-Viikari *et al.* (2002) on how human systems influence environmental outcomes points to the

importance of understanding how interactions between the environment, economic and human dimensions of the framework occur and produce sustainable or unsustainable outcomes.

While the scope of this report did not include specific examination of human systems and their contribution to environmental outcomes, identifying appropriate indicators of human systems and the ways they influence natural resource outcomes is important, and appropriate indicators for this could be incorporated as part of the stocks components of the framework.

Nelson *et al.* (2005) identify key priorities for indicator development in this area for Australian NRM, including key gaps in current knowledge. They developed a framework focussing on aspirations and capacities of natural resource managers, attributes of management practices, external influences such as the social, political and economic context in which managers operate, and outcomes of natural resource management.

Similarly, Yli-Viikari *et al.* (2002) identify key areas for indicator development to monitor human systems and their contributions to NRM outcomes, focussing on the role of social learning, the maintenance and growth of human, social and cultural capital, participation in NRM processes, and institutional structures. Esty *et al.* (2005), meanwhile, focus on human vulnerabilities including food security, environmentally dependent health outcomes, susceptibility to environmental disasters and economic security; and on environmental governance, science and technology and responsiveness of human systems to environmental challenges, with eco-efficiency a key output indicator for measuring social and institutional capacity to deal with environmental challenges.

One of the key recommendations of Nelson *et al.* (2005) is that further work is needed to identify indicators which can usefully represent the human resources and capabilities needed to improve NRM outcomes. This further work could inform future development of 'stock' indicators in the social components of the Signposts framework.

## **7. Conclusions and recommendations**

This report has reviewed the components of the human dimensions of the Signposts framework, and recommended some changes to these components. The changes recommended primarily act to clarify the boundaries of the groups referred to in the sub-categories of the stock and flow components, to provide clearer guidance for subsequent development of indicators.

This report then went on to recommend outcomes and potential indicators for the different components of the human dimensions of the framework. Section 4 clearly demonstrates that there are a number of indicators which can be practicably measured utilising existing data already collected, particularly data held by the ABS and ABARE. However, there are many indicators – particularly those relating to more inherently subjective concepts such as cultural change, and some aspects of social capital – which cannot be monitored robustly in the absence of regular surveys of members of agricultural industries.

## References

- Abrams, M. 1976. *A review of work on subjective social indicators 1971 to 1975*. Occasional Paper in Survey Research No. 8. Social Science Research Council, London.
- ABS (Australian Bureau of Statistics). 2001. *Measuring well-being: frameworks for Australian social statistics*. ABS Catalogue No. 4160.00. ABS, Canberra.
- ABS (Australian Bureau of Statistics). 2003. *Australian Social Trends 2003*. ABS, Canberra.
- ABS (Australian Bureau of Statistics). 2004. *Measuring social capital: an Australian framework and indicators*. Information paper. ABS Catalogue No. 1378.00. ABS, Canberra.
- ABS (Australian Bureau of Statistics). 2005. *Australian Social Trends 2005*. ABS Catalogue no. 4102.00. ABS, Canberra.
- ABS and SNZ (Australian Bureau of Statistics and Statistics New Zealand). 2006. *Australia and New Zealand Standard Industrial Classification (ANZSIC) 2006*. ABS Catalogue No. 1292.0. ABS, Canberra.
- Barr, N.; Karunartne, K. and Wilkinson, R. 2005. *Australia's farmers: past, present and future*. Land and Water Australian, Canberra.
- Black, J. 2002. *A dictionary of economics*. 2<sup>nd</sup> ed. Oxford University Press, Oxford.
- Bobbitt, L.; Green, S.; Candura, L. and Morgan, G.A. 2005. The development of a county level index of well-being. *Social Indicators Research* **73**: 19-42.
- Booyesen, F. 2002. An overview and evaluation of composite indices of development. *Social Indicators Research* **59**: 115-151.
- Bray, J.R. 2000. *Social indicators for regional Australia*. Policy Research Paper No. 8. Department of Family and Community Services, Canberra.
- Brooks, K.; Kelson, S and Tottenham, R. 2001. *Summary of Australian Regional Forest Agreement Social Assessments and a Recommended Assessment Methodology: A report prepared for the Forest Industry Branch, AFFA*. Bureau of Rural Sciences, Canberra.
- Carley, M. 1981. *Social measurement and social indicators: issues of policy and theory*. Contemporary Social Research Series 1. George Allen & Unwin, Boston.
- Chesson, J.; Whitworth, B.; Stewart, J.; and Yapp, G. 2005. *Signposts for Australian Agriculture. Stage 2a: Refinement of preliminary framework and industry profiles to include pathways to ESD*. BRR35. National Land and Water Resources Audit, Canberra.
- Chudleigh, P. and Simpson, S. 2000. *Report on the performance of Rural Research and Development Corporations and options for future performance measures of the rural research and development corporations*. Report to the Rural Research and Development Corporations, March 2000. Agrans Research, Brisbane.
- Cobb, C.W. 2000. *Measurement tools and the quality of life*. Redefining Progress, San Francisco.

- Cummins, R.A.; Eckersley, R.; Pallant, J.; van Vugt, J. and Misajon, R. 2003. Developing a national index of subjective well-being: the Australian Unity Well-being Index. *Social Indicators Research* **64**: 159-190.
- Development and Education Program of the World Bank. 2000. *Sustainable Development Education Program Learning Modules: Glossary*. URL: <[http://www.unesco.org/education/tlsf/theme\\_c/mod13/www.worldbank.org/dpweb/english/modules/glossary.htm](http://www.unesco.org/education/tlsf/theme_c/mod13/www.worldbank.org/dpweb/english/modules/glossary.htm)> Accessed 17/01/2006.
- Esty, D.C.; Yale Center for Environmental Law & Policy; Center for International Earth Science Information Network; Joint Research Centre European Commission; and World Economic Forum. 2005. *2005 Environmental Sustainability Index: Benchmarking National Environmental Stewardship*. Yale Center for Environmental Law and Policy. URL: <http://www.yale.edu/esl> Accessed 12th January 2004
- Evans, M.D.R. and Kelley, J. 2004. Effect of family structure on life satisfaction: Australian evidence. *Social Indicators Research* **69**(3): 303-349.
- Fang, T. and Luchak, A.A. 2005. Deferred compensation and organizational productivity. In Labour and Employment Relations Association Series: Proceedings of the 57<sup>th</sup> Annual Meeting January 7-8 2005, Pennsylvania. Labour and Employment Relations Association, USA.
- Fenton, D.M. and Marshall, N.A. 2001. *A guide to the fishers of Queensland*. Parts A,B and C. CRC Reef Technical Reports 36,37,38. URL: <<http://www.reef.crc.org.au/publications/techreport/index.html>>
- Fenton, M.; Coakes, S. and Marshall, N. 2003. Vulnerability and capacity measurement. In Becker, H.A. and Vanclay, F. (eds). *The international handbook of social impact assessment: conceptual and methodological advances*. Edward Elgar, UK. p. 211-230.
- Foskey, R. 1998. Ageing in small rural communities. Paper presented at *Changing families, challenging futures: 6<sup>th</sup> Australian Institute of Family Studies Conference, 25-27 November 1998, Melbourne*. Australian Institute of Family Studies, Melbourne.
- Fotso, J-C. and Kuate-Defo, B. 2005. Measuring socioeconomic status in health research in developing countries: Should we be focusing on households, communities or both. *Social Indicators Research* **72**(2): 189-237.
- Fraser, D. 2005. *Labour shortages in Australian agriculture: Opinion Piece*. National Farmers Federation, Canberra.
- Frisch, M.B. 1998. Quality of life therapy and assessment in health care. *Clinical psychology: science and practice* **5**: 19-40.
- GHD. 2005. *Social Impact Assessment for Breakout Creek Wetlands*. SIA Report produced for Torrens Catchment Water Management Board. URL: <<http://www.cwmb.sa.gov.au/torrens/Breakout%20Creek%20Stage%20%20-%20SIA%20Report.pdf>>
- Haberkorn, G. 2002. Aging in rural and regional Australia. *Rural America* **17**: 32-39

- Haberkorn, G.; Kelson, S.; Tottenham, R. and Magpantay, C. 2004. *Country Matters: Social Atlas of Rural and Regional Australia*. Bureau of Rural Sciences, Canberra.
- Hart, M. 1999. *Guide to sustainable community indicators*. 2<sup>nd</sup> edition. Sustainable Measures, Connecticut USA.
- Hassall & Associates Pty Ltd, Helen Ross and Mary Maher and Associates 2003. *Profiling – Social and Economic Context: Social Impact Assessment of Possible Increased Environmental Flow Allocations to the River Murray System, Stage 1, Volume 2*. Report prepared for Murray Darling Basin Commission, Hassall & Associates Pty Ltd, Sydney.
- IISD (International Institute for Sustainable Development). 2002. *Seven questions to sustainability: How to assess the contribution of mining and minerals activities*. Mining, Minerals and Sustainable Development (MMSD) Initiative. IISD, USA.
- Institute for Social Research. 2000. *Social benchmarks and indicators for Victoria*. Consultants report for the Department of Premier and Cabinet, Victoria. December 2000. Swinburne University of Technology, Melbourne.
- Kalimo, E. 2005. OECD Social Indicators for 2001: a critical appraisal. *Social Indicators Research* **70**: 185-229.
- Kenny, C. 2005. Does development make you happy? Subjective well-being and economic growth in developing countries. *Social Indicators Research* **73**: 199-219
- Koopman, C.; Pelletier, K.; Murray, J.F.; Sharda, C.; Berger, M.L.; Turpin, R.S.; Hackleman, P.; Gibson, P.; Holmes, D.M. and Bendel, T. 2002. Stanford Presenteeism Scale: Health Status and Employee Productivity. *Journal of Occupational and Environmental Medicine*. **44**(1): 14-20
- Lind, N. 2004. Values reflected in the Human Development Index. *Social Indicators Research* **66**: 283-283.
- Majoral, R. and Sanchez-Aguilera, D. 2000. The ageing of the agrarian population in Spain. *Anglo Spanish Symposium on Rural Geography, July 2000*. University of Valladolid, Spain.
- Marshall, G. 1998. *A dictionary of sociology*. Oxford University Press, Oxford.
- McMullin, J.A. and Cooke, M. 2004. *Labour force ageing and skill shortages in Canada and Ontario*. Research Report W/24, Work Network. Department of Sociology and Workforce Ageing in the New Economy Project, University of Western Ontario, Ontario.
- Michalos, A.C. 2004. Social indicators research and health-related quality of life research. *Social Indicators Research* **65**: 27-72.
- Miles, I. 1985. *Social indicators for human development*. Frances Pinter, London.
- NACCHO (National Association of County and City Health Officials). n.d. A strategic approach to community health improvement. URL: [http://mapp.naccho.org/MAPP\\_Glossary.asp](http://mapp.naccho.org/MAPP_Glossary.asp) Accessed 03/02/2006
- Nelson, R.; Webb, T. and Byron, I. 2005. *A conceptual framework for coordinating the integration of socio-economic information for natural resource*

- management decision makers*. August 2005. Australian Bureau of Agricultural and Resource Economics, Bureau of Rural Sciences and National Land and Water Resources Audit, Canberra.
- Newton, P.W., Baum, S., Bhatia, K., Brown, S.K., Cameron, A.S., Foran, B., Grant, T., Mak, S.L., Memmott, P.C., Mitchell, V.G., Neate, K.L., Pears, A., Smith, N., Stimson, R.J., Tucker, S.N. and Yencken, D. 2001. *Human Settlements, Australia State of the Environment Report 2001 (Theme Report)*. CSIRO Publishing on behalf of the Department of the Environment and Heritage, Canberra.
- Nieboer, A.; Lindenberg, S.; Boomsma, A. and van Bruggen, A.C. 2005. Dimensions of well-being and their measurement: the SPF-IL scale. *Social Indicators Research* **73**: 313-353.
- Noll, H-H. 2002. Towards a European system of social indicators: theoretical framework and system architecture. *Social Indicators Research* **58**: 47-87.
- OECD (Organisation for Economic Co-operation and Development). 1976. *Measuring social well-being: a progress report on the development of social indicators*. THE OECD Social Indicators Development Programme, OECD, France.
- OECD (Organisation for Economic Co-operation and Development). 2006. *OECD Factbook: Economic, Environmental and Social Statistics*. OECD, France.
- Office of the Voluntary Sector. n.d. Glossary of terms. Public Health Agency of Canada. URL: < <http://www.phac-aspc.gc.ca/vs-sb/voluntarysector/glossary.html> > Accessed 03/02/2006
- Orzechowska-Fischer, E. 2004. Labour force ageing: its impact on employment level and structure. The cases from Japan and Australia. *Population and society: issues, research, policy: 12<sup>th</sup> Biennial Conference, 15-17 September 2004, Canberra Australia*. Australian Population Association, Canberra.
- Pepperdine, S. 2000. *Social indicators of rural community sustainability: an example from the Woody Yaloak catchment*. First National Conference on the Future of Australia's Country Towns. The Regional Institute. URL: <http://www.regonal.org.au/au/countrytowns/strategies/pepperdine.htm>
- Perenboom, R.J.M., van Herten, L.M., Boshuizen, H.C. and van den Bos, G.A.M. 2004. Trends in life expectancy in well-being. *Social Indicators Research* **65**(2): 227-244.
- Productivity Commission. 2003. *Social capital: reviewing the concept and its policy implications*. Research Paper. AusInfo, Canberra.
- Productivity Commission. 2005. *Trends in Australian Agriculture*. Research Paper. AusInfo, Canberra.
- Putnam, R. 2000. *Bowling Alone: The Collapse and Revival of American Community*. Simon and Schuster, New York.
- Requena, F. 2003. Social capital, satisfaction and quality of life in the workplace. *Social Indicators Research* **61**: 331-360.

- Rice, R.W.; McFarlin, D.B.; Hunt, R.G. and Near, J.P. 1985. Organizational work and the perceived quality of life: toward a conceptual model. *Academy of Management Review* **10**: 296-310.
- Schirmer, J.; Parsons, M.; Charalambou, C.; and Gavran, M. 2005a. *Socio-economic impacts of plantation forestry in the Great Southern region*. Report produced for FWPRDC Project PN04.4007. Forest and Wood Products Research and Development Corporation, Canberra.
- Schirmer, J.; Parsons, M.; Charalambou, C.; and Gavran, M. 2005b. *Socio-economic impacts of plantation forestry in the South West Slopes of NSW*. Report produced for FWPRDC Project PN04.4007. Forest and Wood Products Research and Development Corporation, Canberra.
- Schirmer, J. and Pickworth, J. 2005. 2005a. *A social assessment of the Marine Scalefish Fishery of South Australia*. Case study report for FRDC Project 2003/056 A social assessment handbook for use by Australian fisheries managers in ESD assessment and monitoring. Bureau of Rural Sciences, Canberra.
- Schirmer, J. and Pickworth, J. 2005. 2005a. *A social assessment of the contributions of commercial fishing to the Gippsland Lakes region of Victoria*. Case study report for FRDC Project 2003/056 A social assessment handbook for use by Australian fisheries managers in ESD assessment and monitoring. Bureau of Rural Sciences, Canberra.
- Sen, A. 1993. Capability and well-being. In Nussbaum, M. and Sen, A. (eds). *The quality of life*. Clarendon Press, Oxford. p. 30-53.
- Sousa-Poza, A. and Sousa-Poza, A.A. 2000. Well-being at work: a cross-national analysis of the levels and determinants of job satisfaction. *Journal of Socio-Economics* **29**: 517-538.
- Stewart, K. 2005. Dimensions of well-being in EU regions: Do GDP and unemployment tell us all we need to know? *Social Indicators Research* **73**: 221-246.
- Stone, W. 2001. *Measuring social capital: towards a theoretically informed measurement framework for research social capital in family and community life*. Australian Institute of Family Studies, Melbourne.
- Sustainable Development Unit. 2005. *UK Sustainable Development Indicators*. Indicators are published on the SDU's website, URL: <<http://www.sustainable-development.gov.uk/progress/index.htm>> Accessed 13<sup>th</sup> April 2006
- Synnot Mullholland Management Services P/L. 2005. *Social Impact Assessment report for the Water Corporation proposal to source water from the South-West Yarragadee aquifer*. September 2005, Report produced for the Water Corporation. Western Australia.
- UN Commission on Sustainable Development. 2001. *Indicators of sustainable development: guidelines and methodologies*. UNCSO.
- USA Sustainable Development Indicators. 1997, 2001. URL: <<http://www.sdi.gov/>>

- Van Schooten, M.; Vanclay, F. and Sloomweg, R. 2003. Integrating environmental and social impact assessment. In Becker, H.A. and Vanclay, F. (eds). *The international handbook of social impact assessment: conceptual and methodological advances*. Edward Elgar, UK. p. 56-73.
- Veenhoven, R. 2005. Apparent quality-of-life in nations: how long and happy people live. *Social Indicators Research* **71**(1-3): 61-86.
- World Bank. 1997. *Expanding the measure of wealth: indicators of environmentally sustainable development*. Environmentally Sustainable Development Studies and Monograph Series, No 17, Washington D.C.
- WRI (Western Regional Institute). 2004. Regional Profiles: A study of performance and trends across the Riverina Region. Commissioned by the Riverina Regional Development Board. WRI, Wagga Wagga.
- Yli-Viikari, A.; Risku-Norja, H.; Nuutinen, V.; Heinonen, E.; Hietala-Koivu, R.; Huusela-Veistola, E.; Hyvonen, T.; Kantanen, J.; Raussi, S.; Rikkonen, P.; Seppala, A. and Vehmasto, E. 2002. *Agri-environmental and rural development indicators: a proposal*. Agrifood Research Reports 5. MTT Agrifood Research Finland, Finland.

## Appendix 1: Types of social indicator

Table A1 below provides a brief overview of key types of social indicators commonly used in indicator frameworks.

**Table A1: Types of social indicator**

Type of social indicator	Description
<b>Subjective/objective</b>	<p><b>Subjective:</b> Indicators that measure personal/individual feelings, beliefs, values, judgments</p> <p><b>Objective:</b> Indicators that measure attributes of a population observable by those external to a population – i.e., without surveying the attitudes or views of that population</p>
<b>Input/process/outcome</b> (also referred to as input, throughput and output measures)	<p><b>Input:</b> Indicators measuring inputs into a process believed to contribute to a defined outcome, e.g. the number of doctors per head of population may be considered an input to health care processes resulting in the outcome of improved health.</p> <p><b>Process:</b> Indicators measuring processes believed to contribute to a defined outcome, e.g. number of visits to the doctor.</p> <p><b>Outcome:</b> Indicators that measure outcomes, e.g. improved health.</p>
<b>Positive/negative/unclear</b>	<p><b>Positive:</b> If the value of the indicator increases, quality of life (or some other outcome) is improving. For example, if life expectancy increases, this is often argued to indicate improved quality of life.</p> <p><b>Negative:</b> If the value of the indicator increases, quality of life (or some other outcome) is falling. For example, an increase in crime rates is often argued to indicate a decrease in quality of life.</p> <p><b>Unclear:</b> It is difficult to identify if a rise in the value of the indicator is positive or negative. For example, rising divorce rates are argued by some to represent decreasing quality of life, while others believe they do not.</p>
<b>Direct/by product</b>	Indicators for which data is collected <b>directly</b> , and indicators for which data is a <b>byproduct</b> produced for other purposes. The distinction is important as byproduct social indicators may not have been collected in ways that allow them to be easily used as social indicators.
<b>Ex post/ex ante</b>	<p><b>Ex-post:</b> Indicators describing the past</p> <p><b>Ex-ante:</b> Indicators predicting the future</p>
Key references: Carley (1981), Miles (1985), Michalos (2004)	

## **Appendix 2: ANZSIC classifications for agricultural industries**

The list below provides the current Australia and New Zealand Standard Industrial Classification (ANZSIC) classification of agricultural industries to the 'farm gate', drawn from ABS and SNZ (2006: 51). The classification has four levels with smaller-scale groups represented by extra digits. The categories listed below do not include those industries which supply products and services to primary producers.

### A Agriculture, fishing and forestry

#### 01 Agriculture

##### 011 Nursery and Floriculture Production

0111 Nursery Production (Under Cover)

0112 Nursery Production (Outdoors)

0113 Turf Growing

0114 Floriculture Production (Under Cover)

0115 Floriculture Production (Outdoors)

##### 012 Mushroom and Vegetable Growing

0121 Mushroom Growing

0122 Vegetable Growing (Under Cover)

0123 Vegetable Growing (Outdoors)

##### 013 Fruit and Tree Nut Growing

0131 Grape Growing

0132 Kiwifruit Growing

0133 Berry Fruit Growing

0134 Apple and Pear Growing

0135 Stone Fruit Growing

0136 Citrus Fruit Growing

0137 Olive Growing

0139 Other Fruit and Tree Nut Growing

##### 014 Sheep, Beef Cattle and Grain Farming

0141 Sheep Farming (Specialised)

0142 Beef Cattle Farming (Specialised)

0143 Beef Cattle Feedlots (Specialised)

0144 Sheep-Beef Cattle Farming

0145 Grain-Sheep or Grain-Beef Cattle Farming

0146 Rice Growing

0149 Other Grain Growing

##### 015 Other Crop Growing

0151 Sugar Cane Growing

0152 Cotton Growing

0159 Other Crop Growing n.e.c.

##### 016 Dairy Cattle Farming

0160 Dairy Cattle Farming

##### 017 Poultry Farming

0171 Poultry Farming (Meat)

0172 Poultry Farming (Eggs)

##### 018 Deer Farming

0180 Deer Farming

##### 019 Other Livestock Farming

0191 Horse Farming  
0192 Pig Farming  
0193 Beekeeping  
0199 Other Livestock Farming n.e.c.

## Appendix 3: Social capital indicators

Table A2 below provides examples of social capital indicators discussed in three recent key reviews of social capital and its measurement in Australia.

**Figure A2: Key social capital indicators**

Indicator category (type of social capital being measured)	Examples of indicators
Norms – trust	<p><b>ABS (2004)</b> Trust and trustworthiness</p> <p><b>Putnam (2000)</b> Social trust % of people agreeing that ‘most people can be trusted’ % of people agreeing that ‘most people are honest’</p> <p><b>Stone (2001)</b> Social trust – extent to which people indicate they trust family and friends Civic/institutional trust – extent to which people indicate they have trust in formal groups and institutions, e.g. government, church, unions, employers</p>
Norms – reciprocity	<p>The ways in which acts of one person/group are reciprocated by others (formally or informally). <b>Stone (2001)</b> identifies the following types of reciprocity:</p> <ul style="list-style-type: none"> <li>• in-kind v. in lieu</li> <li>• direct v. indirect</li> <li>• immediate v. delayed</li> </ul>
Norms - other	<p><b>ABS (2004)</b></p> <ul style="list-style-type: none"> <li>• Sense of efficacy</li> <li>• Cooperation</li> <li>• Acceptance of diversity</li> <li>• Inclusiveness</li> <li>• Common purpose (e.g. extent to which purpose/goals shared)</li> </ul>
Networks – types	<p><b>ABS (2004)</b> Network structure:</p> <ul style="list-style-type: none"> <li>• Network size and links between networks</li> <li>• Network frequency (how often different types of interaction/ exchange occur)</li> <li>• Density and openness (similar to Stone’s ‘structure’ category)</li> <li>• Transience/mobility (e.g. transience of residence in a region, changes in group membership and involvement)</li> <li>• Power relationships (similar to Stone’s relational characteristics)</li> </ul> <p>Network types:</p> <ul style="list-style-type: none"> <li>• Bonding (group homogeneity, density of formal networks)</li> <li>• Bridging (group diversity, openness of local community)</li> <li>• Linking (links to institutions)</li> <li>• Isolation (lack of activity in groups, feelings of social isolation)</li> </ul> <p><b>Stone (2001)</b></p> <ul style="list-style-type: none"> <li>• Size/capacity - size of network, frequency of exchanges occurring within it. E.g. questions may include ‘how many times a week do you communicate with friends?’</li> <li>• Spatial scale – over what spatial area does the network extend (e.g. household to global)</li> <li>• Structure – open or closed (closed referring to networks in which social relations exist among all parties); dense or spare (referring to extent of overlap in network memberships), homogenous/heterogeneous (degree of similarity in characteristics of network members)</li> <li>• Relational characteristics (horizontal networks have members with relatively equal power; vertical networks are hierarchically structured)</li> </ul>

Indicator category (type of social capital being measured)	Examples of indicators
Networks – participation /transactions	<p><b>ABS (2004)</b></p> <ul style="list-style-type: none"> <li>• Sharing support (physical and financial assistance, emotional support and encouragement, expectation of help from colleagues, capacity to seek support)</li> <li>• Integration into the community (use of community facilities, extent of participation in community events, sense of belonging, extent of social networks)</li> <li>• Common action (taking action as part of a group)</li> <li>• Sharing knowledge, information and introductions</li> <li>• Negotiation</li> <li>• Applying sanctions</li> </ul> <p><b>Putnam (2000)</b></p> <ul style="list-style-type: none"> <li>• Community and organisational life (participation on committees, as officer of clubs/organisations, number of organisations per capita, number of meetings attended, number of group memberships)</li> <li>• Engagement in public affairs (voter turnout, attendance at public meetings etc)</li> <li>• Community volunteerism (number of non-profit organisations, number of time individuals participate in events/volunteer work in given time period)</li> <li>• Informal sociability (% of individuals agreeing they ‘spend a lot of time visiting friends’, mean number of times entertained at home during past year)</li> </ul> <p><b>Stone (2001)</b></p> <ul style="list-style-type: none"> <li>• Formal: friend/family interactions</li> <li>• Informal: participation in formal association (membership, meeting attendance)</li> </ul>