

Triple bottom line reporting to promote sustainability of irrigation in Australia

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Abstract Irrigation development induces considerable environmental change, but the expectation has been in the past that the economic and social benefits would be greater than the environmental costs. However, public attitudes change over time from acceptance of development and exploitation to greater concern regarding environmental issues and sustainability. Recently, the irrigation industry has found it difficult to communicate to the wider populace the regional benefits of irrigation and the current activities and investment undertaken to address the environmental sustainability concerns. To address this, irrigation water supply businesses are investigating using a broader reporting structure that includes financial, environmental, and social and cultural elements. This triple bottom line, holistic approach should provide a more balanced view of water use with socio-economic benefits and environmental consequences demonstrated. It is anticipated that this approach embedded in the newly developed Irrigation Sustainability Assessment Framework will lead to a more transparent and informed debate on the sustainable use of resources between all parties.

Keywords Reporting · Murrumbidgee · Murray · Framework · Assessment · River Health

Introduction

The total area irrigated in the Murray and Murrumbidgee basins is half of all the irrigated area in Australia. These irrigated areas use about half (8,600 Megalitres) of all the water used for irrigation in Australia (16,700 Megalitres) to produce about one third (A\$3.1 billion) of the total farm gate revenue. These irrigated regions produce one third of all the

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fresh fruit and vegetables produced in Australia and two thirds of all the wine, table and dried grapes, in addition to extensive areas of grain and fodder cropping (Meyer 2005).

The total population of the Murray and Murrumbidgee regions is 582,000 people, most of who live in large towns (Meyer 2005). Comparison with adjacent rain dependent districts shows that the addition of irrigation increases the level of economic activity and the population that it supports by three to five times (Meyer 2005). Without irrigation, these regions would have far fewer people, fewer substantive communities and fewer public services. The demographic profile of the irrigated regions shows populations that are more diverse in ethnic origin and with a greater proportion of younger people relative to the rain dependant districts (Meyer 2005).

Irrigation development has changed the appearance of large tracts of land in the Murray and Murrumbidgee basins. The large infrastructure investment has brought productive agriculture and community growth to semi arid inland Australia. On the land, native vegetation has been removed, wetlands drained or flooded, earth moved and drainage lines changed and soils cultivated. The extensive clearing and subsequent addition of large volumes of water have caused a fundamental change in groundwater distribution. In the rivers, flow patterns and volumes are very different with return of drainage waters contributing salt, nutrients and chemicals.

There are clear signs that not all of these changes have had a net benefit. There are substantial areas where additions to groundwater have caused the unconfined aquifers to rise forming a water table mound, and salinisation of top soils has significantly reduced productive capacity of the land. Saline groundwater discharges have not only affected some low lying areas in the irrigated regions but they also contribute considerable salt loading to the rivers. These effects, combined with the very large change in the flow and seasonality of the Murray and Murrumbidgee Rivers, have caused large changes in river ecology and the connected floodplain and riverine ecosystems.

The combined effects of infrastructure development water extraction for irrigation, return drainage, groundwater discharge and accompanying salt loads and reduced flow especially of small and medium floods, has caused noticeable and highly publicised changes to the rivers. Concerns by downstream water users together with a heightened sense of environmental awareness have raised the issues of water quantity, water quality and river health to state and national political levels. There is now a reasonably well developed position, particularly among the large urban population of the major eastern state cities that irrigation practice needs to change to achieve a better balance between use of the water for production and use of water for environmental maintenance.

This political and community perception has led irrigation communities and irrigation water supply companies to look for approaches and methods to assist with performance improvement and to transparently demonstrate the total benefits and costs of irrigation. By doing this, a more rational debate and policy implementation can be undertaken as all stakeholders will be more aware of the potential socio-economic tradeoffs associated with the increased demand for some water used by irrigation to be returned to the rivers for environmental flows.

However, irrigation dependent communities have found it difficult to communicate to the wider populace the benefits of irrigation to their regions and the initiatives and investment undertaken to become more sustainable. To address this, irrigation water supply businesses are investigating the use of a broader reporting structure that includes financial, environmental, social and cultural elements. This triple bottom line (TBL) reporting is a holistic approach and should provide a more balanced view of the socio-economic benefits

and environmental consequences of water use. It also provides a useful basis to evaluate the sustainability performance of a business and promote continual improvement.

Triple bottom line reporting

The triple bottom line provides both a model for understanding sustainability and a system of performance measurement, accounting, auditing and reporting (Elkington 1998; Vanclay 2003). This sets the scope of TBL reporting as part of a broader framework of change management for integrating sustainability into business management decisions (Suggett and Goodsir 2002).

It is generally accepted that the triple bottom line refers to the economic, social and environmental aspects of business performance (Global Reporting Initiative 2002). Elkington (1998) refers to the three components as the delivery of environmental quality, social equity and economic prosperity by business. However, the performance of these three factors should not be viewed in isolation from each other, but as an integrated suite for sustainability, and the broad nature of the three components should not be lost in a narrow indicator definition process that loses sight of the integrated and all encompassing nature of sustainability (Vanclay 2003).

TBL reporting or sustainability reporting is not just a communication tool, but becomes a part of a process to improve the sustainability of an organisation. A very important aspect of TBL reporting is the underlying iterative process of the learning cycle (Plan–Act–Observe–Reflect) that surrounds the publication and review of a TBL report that assists in enhancing the sustainability of the organisation through continuous improvement. Stakeholder engagement throughout the process enhances the objective setting and decision making of the organisation and provides some level of ownership of the outcomes by the wider community. Stakeholder involvement also provides a degree of verification in the reporting process so that the information reported is understandable, accurate, useful and credible.

A widely accepted format for the integration of triple bottom line concepts about sustainability into business is provided by the 2002 Global Reporting Initiative (GRI) guidelines. These guidelines are used by Australian and international businesses to produce reports that rank highly on the world sustainability reporting stage (SustainAbility 2004). Triple bottom line reporting, including the use of GRI format, is increasingly evident in the broader water utility industry and is becoming an important tool to complement sustainability management within irrigation companies.

Hopwood et al. (2005) provide some context for the acceptability of a triple bottom line approach to sustainability in business. This is achieved by identifying three broad approaches which map the degree of environmental concern against the degree of socio-economic and well being concern associated with a variety of sustainability concepts. The three broad approaches identified are status quo, reform and transformation. The business management and sustainability relationship that exists in the triple bottom line concept is associated with both the status quo and reform approaches. The status quo approach accepts that existing business and government structures will be able to achieve sustainable development with business seen as a key driver (Hopwood et al. 2005). The World Business Council for Sustainable Development is mapped within the status quo approach, and is a leading advocate for the concept of voluntary triple bottom line reporting by organisations. This view of business as a leader for society in achieving sustainability is shared with the sustainability reporting group, the Global Reporting Initiative. The reform approach to

sustainability recognises that some significant changes in policy and lifestyle are necessary but that these can be achieved over time within existing social and economic structures (Hopwood et al. 2005). The Brundtland report (Brundtland 1987) with its concept of ecologically sustainable development is mapped by Hopwood et al. (2005) on the boundary between the status quo and reform approaches to sustainability. Ecologically sustainable development has been identified by Vanclay (2003) as “...totally consistent...” with the triple bottom line approach. Mapping the proponents of a triple bottom line approach to sustainability in this way can demonstrate that the sustainability approaches favoured by business are those that integrate within the existing or slightly reformed social decision making structures i.e. status quo or reform, as distinct from an approach that calls for radical transformation of social, institutional or organisation decision making arrangements.

A context for sustainable development and water management in Australia

Sustainability in its current and popular form has grown out of the principles of ecologically sustainable development encapsulated by Brundtland (1987) as “...development that meets the needs of the present without jeopardising the ability of future generations to meet their needs.” This is a definition endorsed by the Business Council of Australia (Suggett and Goodsir 2002). In Australia, sustainable development is defined by the 1992 National Strategy for Ecologically Sustainable Development as “...development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends...” (Commonwealth of Australia 1992). The national strategy also provides core objectives and guiding principles that together help define the approach required to achieve the goal of ecologically sustainable development for Australian government, business and community. The intent of the national strategy is reflected in Commonwealth and State legislation dealing with sustainability. Business plays a critical role in achieving sustainability through the national strategy by ensuring that the economy and production base are put onto an ecologically sustainable footing.

In Australia, the National Water Initiative (National Water Commission 2004) and the Council of Australian Governments (COAG) 1994 water reforms, provides a more focused policy context for sustainability in irrigation. The National Water Initiative aims to improve certainty for investment and the environment while supporting capacity for change to a water management approach that maximises triple bottom line outcomes. These aims are recognised within a context of a need to increase the productivity and efficiency of water use, adequately service communities, and to return surface water and groundwater systems to environmentally sustainable levels of water extraction.

Legislation can play a significant role in setting the context of performance reporting for irrigation companies in Australia, by setting definitions and report requirements. Traditional annual financial reporting by companies is regulated by legislation such as the *Commonwealth Authorities and Companies Act* 1997 and the *NSW Corporations Act* 2001 but does not include legislation which captures sustainability principles. Other reporting undertaken by irrigation companies for compliance purposes is linked to legislation incorporating concepts of sustainability but is heavily focussed on environmental aspects with little reporting on economic and social issues. For example, in NSW, the irrigation companies of the Murrumbidgee and Murray regions produce environment reports to satisfy their licence obligations under the *NSW Water Management Act* 2000 and the *NSW Protection of the Environment Operations Act* 1991.

Table 1 Best practice reporters in Australia

Company	Rank
Rio Tinto	8th in the top 50 reports
BHP Billiton	16th in the top 50 reports
City West Water	Report in the top 100 but not top 50
Melbourne Water	Report in the top 100 but not top 50
Sydney Water	Report in the top 100 but not top 50
Westpac	Report in the top 100 but not top 50

Source: after SustainAbility (2004)

The uptake of sustainability reporting by businesses in Australia seems slower than in other countries (Centre for Australian Ethical Research 2004) but this does not mean that the quality of reporting by Australian businesses is inferior. In a worldwide assessment of sustainability reporting, six Australian companies, including three water service providers, achieved reports that were judged in the top 100 (Table 1). Achieving a rank in the top 100 means that these reports should be considered as best practice (SustainAbility 2004).

The main factors that influence a business or organisation to adopt the triple bottom line as a means to integrate sustainability into business management and performance reporting can be broadly grouped into eight drivers (Table 2).

Within the urban and rural water supply industries, these drivers have influenced organisations to move beyond compliance to reporting that allows a more balanced account of sustainability performance across the TBL. For irrigation water supply companies TBL reporting is also seen as a valuable communication tool to provide balanced information regarding the environmental impacts and socio-economic benefits relating to irrigation to the wider public. It also provides these companies with an opportunity to demonstrate the efforts being undertaken to become more sustainable, and in particular, the effort and

Table 2 Drivers for sustainability reporting

Driver	Description
Ethical	Ethical obligations accepted by corporate executives
Accountability	Social expectations for broader corporate accountability, transparency and improved ethical behaviour, particularly with social and environmental issues i.e. a licence to operate
Financial	To highlight the value of the business in order to attract investment, improve shareholder value and market position i.e. increases investor confidence. Sustainability reporting could be driven by the community recognition that sustainability generates greater economic returns.
Communication	A process to enhance constructive engagement with external stakeholders
Risk	To aid in risk management (strategic, financial, operational, commercial and technical risk)
Legislation	Legally obligated as part of licence to operate to disclose particular areas of business performance e.g. financial, environmental impacts, social governance
Business management	Improve the operation and management of the business, i.e. cost savings from cleaner production, enhance production efficiencies, lower health and safety costs, improve employee motivation, increase access to finance, influence regulation by best practice, attract investment, increase reputation and market advantage
Benchmarking	The ability to benchmark performance with similar businesses

investment in reducing the negative environmental impacts of irrigation. There is a broad desire by the irrigation industry to promote more transparency and objectivity in debates regarding irrigation in the public domain, to avoid misinformation and to improve the public perception of irrigation. Irrigation water supply companies believe that TBL reporting can help in communicating a more balanced perspective on irrigation.

The GRI framework for TBL reporting

The 2002 guidelines from the Global Reporting Initiative (GRI) provide a frequently referenced guide for triple bottom line reporting (Centre for Australian Ethical Research 2004; Nelson and Wilson 2003; SustainAbility 2004; Suggett and Goodsir 2002; van der Lee and Wolfenden 2002). The GRI guidelines provide a voluntary framework for business to adopt when reporting on actions, outcomes and strategies for the future (Global Reporting Initiative 2002).

The popularity of GRI guidelines among reporters could be due to the clear direction provided on report content, in particular indicators for performance across the triple bottom line and the flexibility to adopt the framework through a continual improvement process over time. Of equal or greater importance are the principles provided to guide reporting that is a balanced and reasonable account of performance, contributes to sustainability in a way that facilitates temporal and inter-organisation comparisons and credibly addresses stakeholders concern (Global Reporting Initiative 2002). The 11 principles are presented as a framework of understanding between reporting organisations and report users about the underpinnings of a GRI based report (Table 3).

As a reporting tool, the GRI guidelines do not provide the performance management tools such as codes of conduct, performance standards or management systems that are the subject of reporting (Global Reporting Initiative 2002; Suggett and Goodsir 2002).

Triple bottom line reporting by water providers in Australia

VicWater (2002) asserts that the triple bottom line approach is a natural fit with the water industry (both potable and raw) as water is a precious resource and its management by water businesses impacts on the environment, economy and health and well-being of the

Table 3 The Global Reporting Initiative reporting principles

Principles	Function
Transparency	Starting point in the framework and basis for all principles
Inclusiveness	
Sustainability context	
Relevance	Determines what the organisation should report
Completeness	
Neutrality	
Comparability	
Accuracy	Guides the quality and reliability of the report content
Clarity	
Timeliness	
Auditability	Closes the framework and allows for report preparation and content to be tested against expectations

Source: after Global Reporting Initiative (2002)

communities those water companies serve. These links are plain enough to see in irrigation dependent communities.

Triple bottom line reporting is not new to the water industry with Australian water providers such as City West Water, Melbourne Water and Sydney Water undertaking sustainability reporting which is considered best practice on the world stage (Table 1). The occurrence of TBL reporting is more prevalent amongst potable supply businesses but there is also some incidence of TBL approaches in rural or irrigation water supply organisations. For example, Murray Irrigation Limited (MIL) used the GRI framework to produce an environment report in 2004 that shifts the company reporting towards a triple bottom line performance approach (Murray Irrigation Ltd 2004). Organisations such as Coleambally Irrigation Cooperative Ltd (2004), Murrumbidgee Irrigation Ltd (2004) and Goulburn-Murray Water (2004) have general aspects of triple bottom line reporting but all fall short of a sustainability report as they do not meet all the criteria as derived by SustainAbility (2004). The best practice reporters shown in Table 1 were ranked by SustainAbility (2004) according to the extent that they met the following seven sustainability reporting criteria:

1. The report includes elements of environmental, social and economic reporting.
2. The company presents a coherent vision of sustainability.
3. The company's key sustainability challenges are clearly stated and prioritised.
4. The company's sustainability strategy is clear.
5. There is a balance of environmental, social and economic performance data presented.
6. The report is comprehensive, useful and clear in information and design.
7. The report uses various forms of assurance, including stakeholder comments, verification and other external reviews.

These criteria provide a basis for comparison of organisations that are already integrating sustainability into their management and operations. A summary of the analysis of each irrigation company's report, using the seven criteria is given in Table 4.

Some of the reports reviewed did not meet the seven criteria for a sustainability report (Table 4). The main areas for improvement that organisations need to develop in reporting are: vision and strategy for sustainability, definition and prioritisation of sustainability challenges for the organisation, presentation or analysis of data on performance across the triple bottom line and use of assurance processes, including stakeholder comment. These characteristics are issues that could be addressed by making use of a triple bottom line business management model and reporting framework such as that provided by the Global Reporting Initiative guidelines complimented by irrigation specific guidance. In this way the triple bottom line approach could provide a pathway for organisations to undertake a continuous improvement approach to developing the sustainability of their business and reporting that performance.

Triple bottom line reporting case study: Murray Irrigation Ltd

Murray Irrigation Ltd (MIL) is Australia's largest private irrigation company, formed in 1995 when the NSW Government transferred ownership of the Murray Irrigation Area and Districts to irrigators.

As a condition of privatisation, MIL was issued two licences:

1. Irrigation Corporation Water Management Works License, by Department of Natural Resources

Table 4 Analysis of sustainability reporting by irrigation industry organisations

Organisation name	Report type	Sustainability report assessment criteria							
		All elements of a sustainability report met	The report includes elements of TBL reporting	The company presents a coherent vision of sustainability	Sustainability challenges are clearly stated and prioritised by the company	Sustainability strategy is clear by the company	There is a balance of TBL performance data presented	The report is comprehensive, useful and clear in information and design	The report uses various forms of assurance (stakeholder comments, verification, external reviews)
Coleambally Irrigation Co-op Ltd	Annual report (2003/04)	No	✓	X	X	X	X	✓	X
Murray Irrigation Ltd	Environment report 2004	Yes ^a	✓	✓	✓	✓	✓*	✓	✓
Murrumbidgee Irrigation Ltd	Annual report (2003/04)	No	✓	X	X	X	X	✓	X
Goulburn-Murray Water	Annual report (2003/04)	No	✓	X	X	X	X	✓	✓

North Burdekin Water Board	Annual report (2003/04)	No	X	X	X	X	X	✓	✓	X
State Water	Annual report (2003)	No	✓	X	✓	✓	✓	✓	✓	X
Sydney Water	Annual report (2003/04)	Yes	✓	✓	✓	✓	✓	✓	✓	✓
SunWater	Annual report (2003/04)	Yes	✓	✓	✓	✓	✓	✓	✓	✓
SA Water	Sustainability report 2003	Yes	✓	✓	✓	✓	✓	✓	✓	✓
City West Water	Sustainability report 2004	Yes	✓	✓	✓	✓	✓	✓	✓	✓
Melbourne Water	Annual report (2003/04)	Yes	✓	✓	✓	✓	✓	✓	✓	✓

^a Lack economic information due to financial statements in annual report not audited at time of publication.

2. Environment Protection Licence, by Department of Environment and Conservation

MIL also undertook to manage the natural resources of the region and became the implementation authority for the Murray Land and Water Management Plans.

These licences and Land and Water Management Plan (LWMP) funding authorities required the production of an annual report to monitor MIL's licence compliance to ensure the company did not neglect their environmental responsibilities and to track progress of LWMP implementation.

Compliance reporting originally involved only the presentation of the required data but gradually expanded to provide greater context, explanation of trends and beyond compliance activities. By 2000 the report had become large and cumbersome. Although it incorporated "good news" stories about the region's environmental performance it was too large and detailed for a general audience and was not a true triple bottom line sustainability report.

In a desire to have a better reporting methodology and to demonstrate to the community that irrigated agriculture can be sustainable, various reporting methodologies were researched by MIL, uncovering the GRI framework, which provided the company with a logical process to move from its current reporting practices to triple bottom line reporting. Now that environmental reporting is no longer driven by the licensing; it provides an opportunity for recognition of the region's good environmental performance, transparency in reporting and adds to the credibility and professional standing of the company.

MIL is now approaching their third year of GRI reporting and are half way towards full compliance with GRI. MIL believes that adopting a reporting initiative such as GRI will progress improvements in environmental/sustainability reporting more rapidly than developing a new in-house framework. MIL have acknowledged that achieving GRI status is not as simple as finding the information to fulfil the criteria; systems must be developed and in place in order to capture the appropriate data. Also, and perhaps more importantly the emphasis of GRI on the need for strategies with clear objectives and targets has led to serious reflection by the company on its future direction. This will, in the next 12 months, lead to the development of a new 15 year environmental strategy and a business plan that will set targets to report against, also making GRI alignment easier. The GRI has been a significant catalyst in all this.

In an effort to get feedback on their reports, MIL have begun submitting their report to some reporting awards such as the Australasian Reporting Awards and Association of Chartered Certified Accountants awards. The 2003/2004 environment report received a bronze award.

Development of an irrigation sustainability assessment framework

The "sustainability challenge" project of the Cooperative Research Centre (CRC) for Irrigation Futures was developed to understand and promote irrigation sustainability through triple bottom line reporting by irrigation water managers around Australia. An important aim of the project is to provide an adaptive framework and methodology for improved triple bottom line reporting by irrigation organisations (both rural and urban), which provides a means of measuring the sustainability of the environmental, economic and social issues of concern to the stakeholders. In the current study, the research question or hypothesis posed is "How can irrigation companies contribute to sustainable irrigation development through triple bottom line reporting on the relevant environmental, economic and social aspects?"

An entirely appropriate framework for triple bottom line reporting does not exist for the irrigation industry. The GRI clearly identifies both the strengths and limitations of their system, and emphasizes the need to use the GRI guidelines with other sustainability assessment methods to overcome the limitations in applying it to complex systems. A major advantage of GRI is that it provides a unified approach based on important guiding principles that can lead to comparability, especially across sectors. However, in developing a unified approach across sectors, there is a danger that important sector-specific issues are not adequately emphasized. The GRI has initiated the development of sector supplements and protocols to be used with the guidelines and so deal with more specific reporting needs of specific sectors. The GRI also proposes a highly generalised three-tier structuring system, comprising of categories, aspects and indicators. However in dealing with complex systems, a more sector-focused and objective-driven structure may be needed to deal more comprehensively with the sector specific sustainability issues, as discussed in Chesson et al. (2000).

The GRI approach is being adopted by urban and rural water providers in Australia, as it is a fairly flexible and adaptable framework. The secondary and tertiary industry bias is a factor that restricts the suitability of the GRI approach for primary industries such as irrigation. In this context the sustainability challenge project is developing an Irrigation Sustainability Assessment Framework (ISAF) that is consistent with the GRI approach to facilitate reporting in the Australian irrigation industry.

A popular and relatively straight forward approach to sustainability assessment and reporting using selected core sets of indicators has failed to live up to expectations in dealing with complex natural resource socio-economic systems like agriculture and fisheries (Chesson 2002). A more successful approach to measuring sustainability in complex systems has been to use a structured approach to identifying the main issues of concern to stakeholders or the objectives relating to sustainability, and then address these objectives using selected indicators and performance measures (Chesson et al. 2000). This approach correctly shifts the focus to what the stakeholders want to achieve and the indicators become a means of reporting against the specific objectives. The sustainability challenge project has used this insight to develop an ISAF that provides a structured objective-driven approach. Adoption of an objective-driven approach does not necessarily guarantee sustainability, but it does provide a clear framework for assessment and reporting to improve performance, as discussed below.

The ISAF is aimed at irrigation water provider and urban water provider companies. The reporting unit will therefore be a physical entity with a specific geographical region. This allows reporting to be directly linked to management actions by the stakeholders in the area. Although the ISAF is being developed by working with water provider organisations, it is possible to modify the assessment framework for application by other irrigation related organisations. We propose a structured framework and methodology which consists of four tiers (Fig. 1);

- (1) Sustainability principles,
- (2) High-level objectives,
- (3) Component trees to define operational objectives and
- (4) Indicators and performance measures (Fig. 1).

Each water provider company can adapt the generic component tree to suit its circumstances in defining the operational objectives, indicators and performance measures. The water provider companies can report against each selected operational objective, using

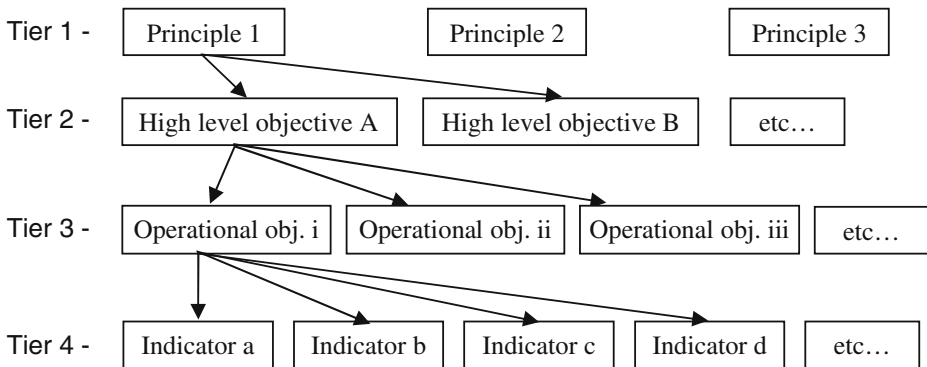


Fig. 1 Four tiers of Irrigation Sustainability Assessment Framework (ISAF)

the indicators to measure performance and the associated management response. Quantitative indicators should be used wherever possible, as discussed in GRI guidelines.

Since the ISAF is designed for use within the irrigation sector we hope to have the sustainability principles as a shared overarching vision and high-level objectives as shared goals. At the higher levels the generic tree is also likely to be similar for all water provider companies, while at the lower levels they can and will diverge in response to different local environments. For instance, the water provider companies can select their preferred indicators to suit the local monitoring and reporting requirements, thereby providing the appropriate flexibility required to promote voluntary adoption. The achievement of common objectives, rather than measurement of common quantities, become the basis for reporting progress and hence are more likely to be accepted by the industry at a national level.

The sustainability principles that we have developed are based upon Australian accepted definitions of sustainability (Commonwealth of Australia 1992). The National Water Initiative is a joint initiative of federal and state governments aiming at sustainable use of water resources in Australia. The National Water Initiative has recognised the continuing national imperative “to increase the productivity and efficiency of Australia’s water use, the need to service rural and urban communities, and to ensure the health of river and groundwater systems by establishing clear pathways to return all systems to environmentally sustainable levels of extraction for irrigation and other uses” (National Water Commission 2004). This statement directly relates to triple bottom line sustainability associated with our water resources. Based on the above and other nationally accepted sustainability policy directions, our irrigation sustainability principles can be broadly identified as follows:

1. Ensuring the health of river, groundwater and drainage water systems that provide the irrigation water supplies, and maintaining extractions at sustainable levels;
2. Using, conserving and enhancing the land, water and biota resources in the irrigation areas and associated areas, now and into the future; and
3. Maintaining and improving the economic benefits and social services to irrigation related rural and urban communities to enhance the quality of life, now and into the future.

We hope to communicate with Australian water providers and irrigation industry at large to obtain feedback on these principles as the starting point for a national approach to

Table 5 ISAF tier levels and associated GRI levels

ISAF tier level	Associated GRI level
Sustainability principles	Vision and strategy
High-level objectives	Category
Components for high-level objectives, and identification of operational objectives	Aspect
Sustainability indicators and business performance measures	Performance indicators

sustainability reporting and the first tier of the ISAF. Selected case studies will be used for developing and testing the ISAF, and for obtaining the stakeholder feedback.

The four tiered ISAF is not intended as a stand alone approach but rather for complementary use and integration into the GRI reporting format, providing the irrigation industry specific context to the generic nature of GRI, whilst retaining the credibility associated with the internationally accepted GRI framework. As such, the ISAF is complementary to the GRI sustainability reporting approach, in providing a more detailed assessment framework on the specific scientific and technological sustainability aspects of the irrigation sector for voluntary compliance reporting. Thus, the tiers in the ISAF can be closely associated with the various levels in the current GRI guidelines (Table 5).

Stakeholder involvement is a very important component in developing the ISAF and in refining it to meet the specific local needs of sustainability reporting within the irrigation industry. Thus, stakeholder involvement and feedback will be sought through selected case studies in identifying the high level objectives, developing the generic component tree and in evaluating the proposed system by applying it to selected water provider companies in pilot studies. This consultative process will be combined with a communication process to accelerate the progress of development of an ISA framework which is acceptable to the industry as a national framework. This will involve an iterative process of documentation and presentation of the current development of the ISAF, incorporating feedback from stakeholder participation and consultation.

Developing the detailed aspects of the assessment framework will draw on existing national approaches to natural resource management proposed for use by regionally-based Catchment Management Authorities. For instance, in the state of New South Wales (NSW), the Natural Resources Commission (NRC) has developed state wide standards and targets for natural resource management (NRC 2004). The standards and targets as much as they relate to sustainable irrigation within a catchment can be used for the development of the ISAF in a NSW context, along with information provided by feedback from the stakeholders in specific case studies.

Conclusions

Irrigation in inland south-eastern Australia has developed productive systems that support a population and revenue base that would otherwise not be possible from rain dependant agriculture alone. In the process of bringing about this development there has been considerable change in the land and vegetation and the supplying river systems. The current,

wider community assessment is that the net benefit from irrigation and other land use change is too heavily weighted to production outcomes at too great an expense of the environmental resources. Hence there is considerable pressure on irrigators and the water supply authorities to improve their performance and to demonstrate their beneficial effects not only in the economic dimension but also in the social and environmental dimensions. The increasing use of a triple bottom line management and reporting arrangement is one way of identifying where improvement can be made and gauging how this is changing over time.

The triple bottom line provides a dual function as a model for business management planning and a framework for reporting that places business in the context of widely accepted approaches to sustainability within society. There is a desire by the community that businesses/organisations become more responsible and transparent about the sustainability issues over which the business has some influence or impact. This desire for an ethical and accountable approach to business management combines with the drivers of financial value, risk management, compliance with legislation and benchmarking performance to an increase in sustainability reporting by water based and other corporate organisations in Australia across the triple bottom line of economic, environmental and social disciplines.

Through the “sustainability challenge” project of the CRC for Irrigation Futures we have proposed an adaptive framework and methodology for improved triple bottom line reporting by irrigation organisations, to enhance sustainability in environmental, economic and social issues of concern to the stakeholders. The proposed framework for irrigation sustainability assessment consists of four tiers, namely sustainability principles, specified high-level objectives, generic component trees to define operational objectives, and associated indicators and performance measures. This Irrigation Sustainability Assessment Framework is complementary to the Global Reporting Initiative sustainability reporting approach, in providing a more detailed assessment framework on the scientific and technological sustainability aspects of the irrigation sector for voluntary compliance reporting.

It is hoped that Irrigation Sustainability Assessment Framework will help irrigation organisations to set triple bottom line sustainability objectives, develop management goals and report performance on achieving these goals. Communicating a more balanced appraisal of the socio-economic benefits and environmental costs of irrigation through triple bottom line reporting, following an accepted international standard, should also engender greater confidence in the wider community regarding the performance and place of irrigation in Australia.

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