

Water Accounting
Standards Board
An independent advisory Board to the Bureau of Meteorology



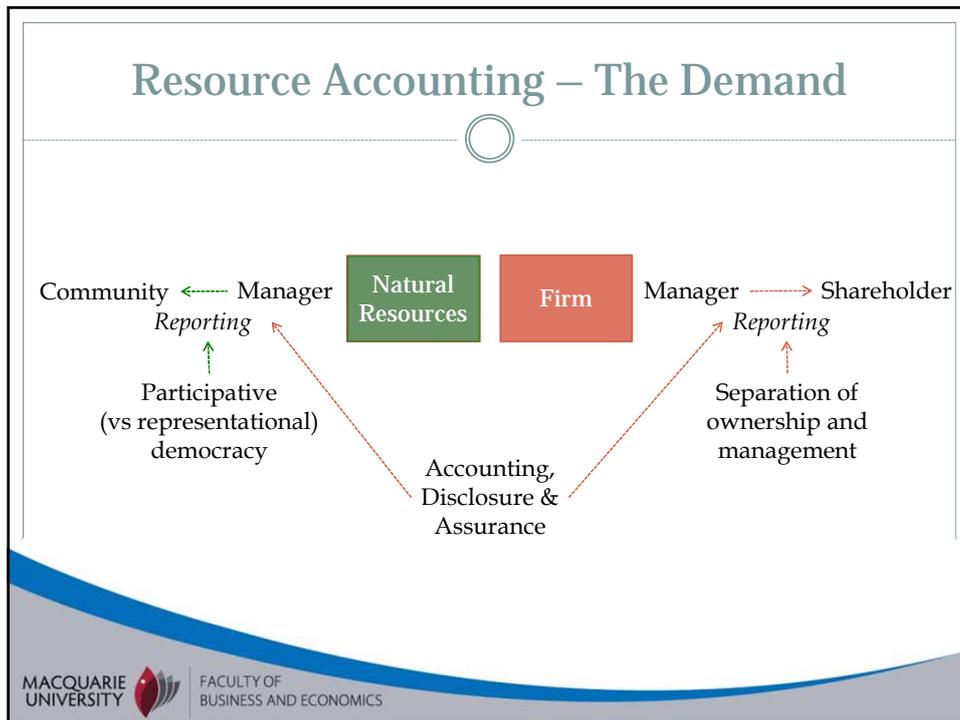
Water Accounting

Lorne Cummings

Professor of Accounting

MACQUARIE UNIVERSITY  FACULTY OF BUSINESS AND ECONOMICS

Natural Resource Accounting



Resource Accounting – The Opportunity

- Water
- Carbon
- Pollutants
- Biodiversity
- Threatened species
- Soil
- Animal welfare

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Resource Accounting – The Opportunity

China CO2 emissions: National vs Provincial aggregation

	2007	2008	2009	2010
Provincial summation	7,334	7,731	8,240	9,084
National total	6,359	6,848	7,266	7,693
Gap (Gigatonnes):	1.0	0.9	1.0	1.4

Source: Guan *et al.*, (2012), "The gigatonne gap in China's carbon dioxide inventories", *Nature Climate Change*, Vol. 2 No. September, pp. 672-675.



Key Challenges for Resource Accounting

- What are the decisions users need to make?

Buy / Sell / Hold

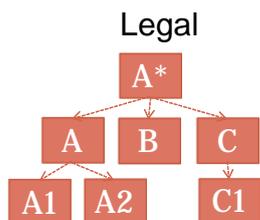
vs

Determine investment risk / Trade resource allocations / Relocate operations / Change production / Determine govt intervention in markets
Boycott products / Revoke license to operate

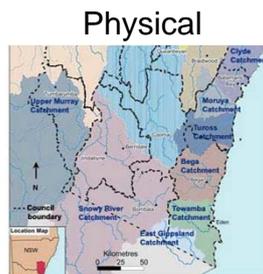


Key Challenges for Resource Accounting

- What is the appropriate unit of analysis?



VS



Key Challenges for Resource Accounting

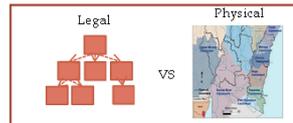
- How do we account for forecasts?



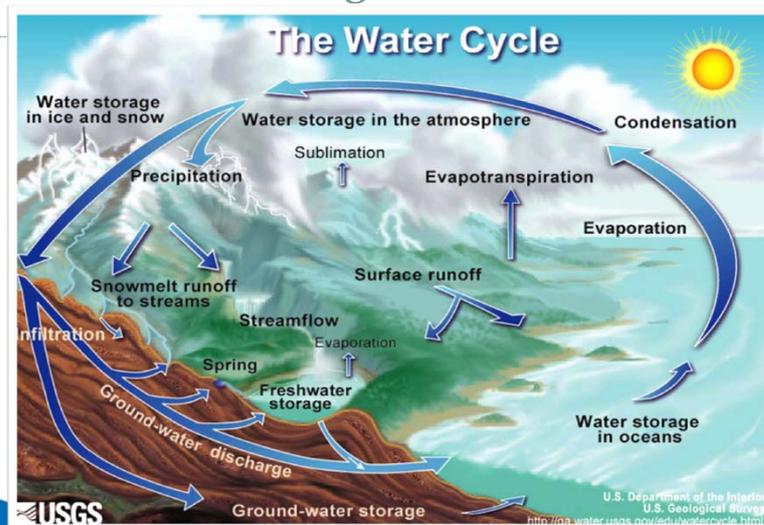
Key Challenges for Water Accounting Too!

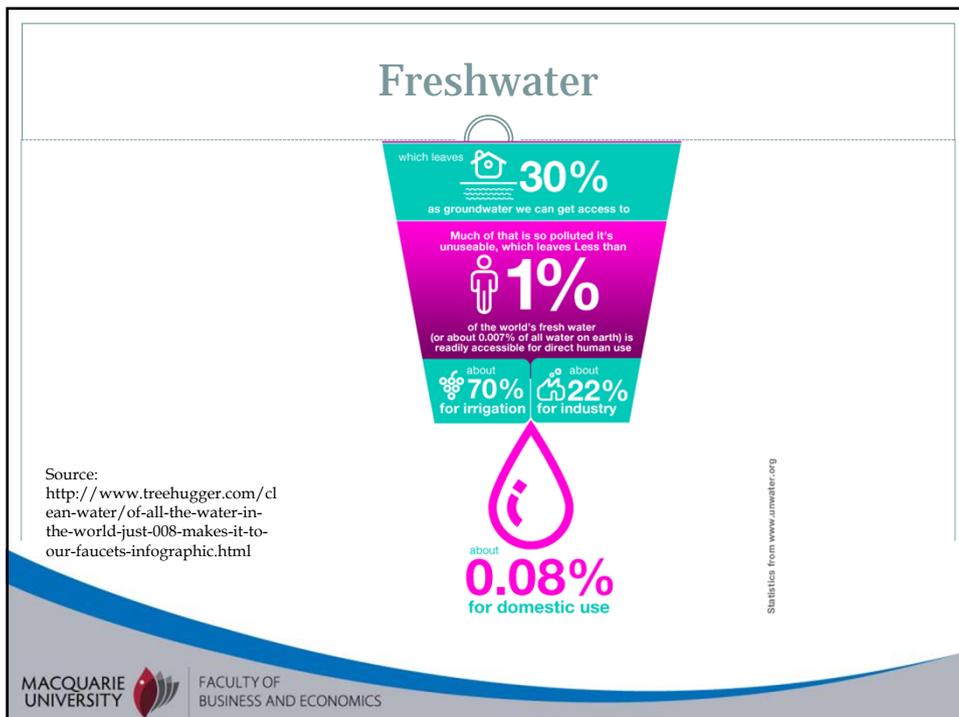
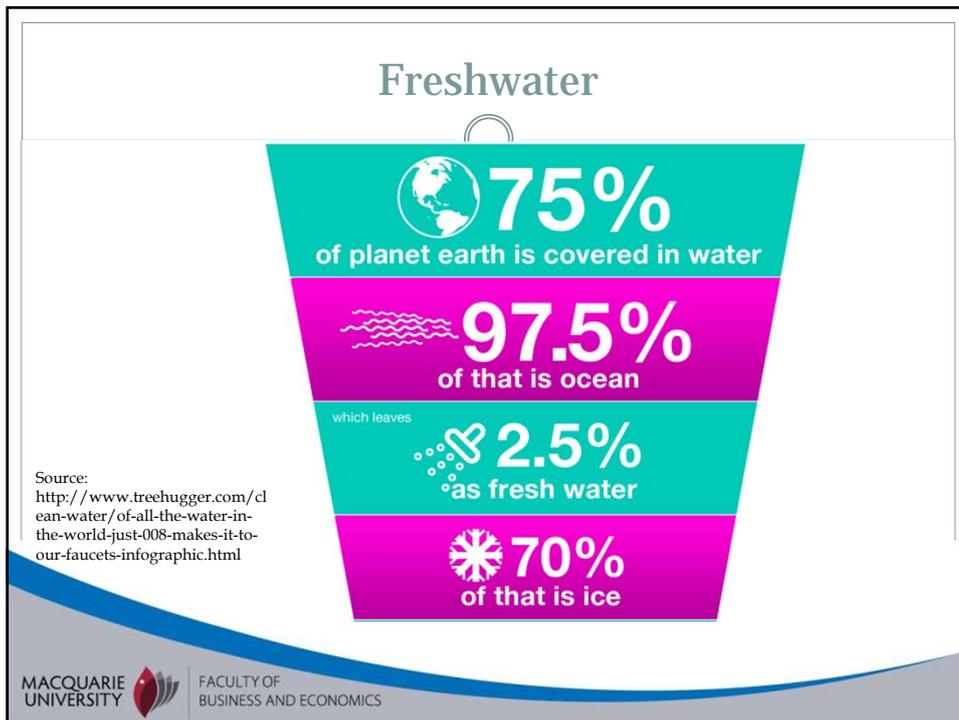
- What are the decisions users need to make?
- What is the appropriate unit of analysis?
- How do we account for forecasts?

Buy / Sell / Hold
vs
Determine investment risk / Trade resource allocations / Relocate operations / Change production / Determine govt intervention in markets Boycott products / Revoke license to operate



Surface and groundwater

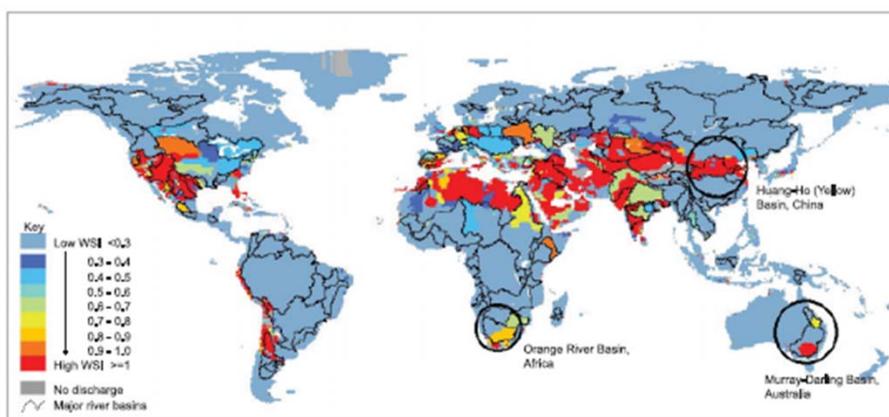




Water stress

- **3 billion people predicted to live in water-stressed areas by 2050**
 - (Falkenmark and Rockstrom 1993)
- **Australian water usage expected to increase from 24,000 GL to 40,000 GL by 2050**
 - (CSIRO 2002)
- **Water stress is expected to be exacerbated by climate change**
 - (Intergovernmental Panel on Climate Change, 2007)

Global water stress



Smakhtin et al 2004 Global env freshwater requirements

Water allocation in Australia

- Multiple users: Towns, industry, irrigators, the environment
- Water sharing plans exist in most catchments (including the Murray Darling Basin Plan)
- Water rights are increasingly traded:
 - Entitlements (= Share)
 - Allocations (= Dividend)



The limitations of using price to allocate water

- Monopoly providers
- Inelastic demand curves
- Strategic importance of water-dependent products such as food
- 'Lumpy' investments in supply capacity (e.g. dams, desalination)
- Environmental considerations key, but can only participate by proxy
- Price set on basis of cost recovery rather than demand management



World Water Development Report 4

Freshwater is not being used sustainably according to needs and demands. Accurate information remains disparate, and management is fragmented. In this context, the future is increasingly uncertain, and risks are set to deepen. If we fail today to make water an instrument of peace, it might become tomorrow a major source of conflict.

United Nations (2012), World Water Development Report 4, Vol. 1, p. vi

- WWDR 4 released March 2012
- Vol 1, Chapter 6 discusses water information



Managing Water
under Uncertainty
and Risk

THE UNITED NATIONS WORLD WATER
DEVELOPMENT REPORT 4
VOLUME 1



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Corporate water accounting

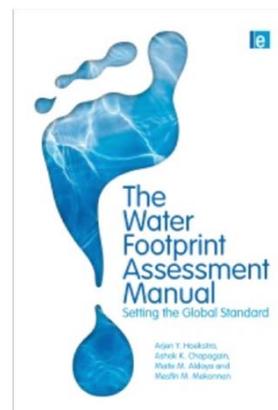
GRI (3.1 & Draft G4) water reporting requirements

- **A number of GRI indicators relate to water:**
 - Water withdrawn from the environment by source (EN8 - core)
 - Water sources significantly affected by withdrawals (EN9 - additional)
 - Recycling and reuse of water (EN10 - additional)
 - Water discharged by quantity and destination (EN21 - core)
 - Impact of discharges (EN25 - additional)
- **However significant issues relate to:**
 - A lack of disaggregation requirements
 - The difficulty for organisations to assess impacts



Water Footprint Standard

- **Water footprinting is an emerging area, building on the ecofootprint idea**
- **Key strength is it can be applied to countries, organisations and/or products, and across the supply chain**
- **Key criticism is that it doesn't take extraction context into account**



WBCSD Global Water Tool

- Free spreadsheet, designed to help identify operations in water-stressed areas
- Utilises a range of historic and projected measures of water stress
- Outputs in common data formats (GRI, WDP etc.) as well as a map



Key water disclosure studies (2012-2010)

- Godfrey, J. M. and Chalmers, K., Eds. (2012). *Water Accounting - International Approaches to Policy and Decision-making*. Cheltenham UK, Edward Elgar.
- Chalmers, K., Godfrey, J. M. and Lynch, B. (2012). "Regulatory theory insights into the past, present and future of general purpose water accounting standard setting", *Accounting, Auditing & Accountability Journal*, Vol. 25 No. 6, pp. 1001-1024.
- Carbon Disclosure Project. (2012), *CDP Water Disclosure Australia Report 2011*,
 - available at: <https://www.cdproject.net/CDPResults/CDP-Water-Disclosure-Australia-Report-2011.pdf>
- CIMA (Chartered Institute of Management Accountants). (2011), *Apocalypse H2O: Case studies on Puma and Rio Tinto*,
 - available at: http://www.cimaglobal.com/Documents/Thought_leadership_docs/Sustainability%20and%20Climate%20Change/H2O_case_studies_v7.pdf
- UNEP. (2011), *Water Footprint and Corporate Water Accounting for Resource Efficiency*,
 - available at: <http://www.waterfootprint.org/Reports/UNEP-2011.pdf>
- The Association of Chartered Certified Accountants, the Net Balance Foundation and the Sustainable Investment Research Institute.. (2010), *Disclosures on water*,
 - available at: http://www.siris.com.au/newsfiles/Water_Disclosure_SIRIS.pdf
- Barton, B. and Morgan-Knott, S. (2010). *Murky Waters? Corporate Reporting on Water Risk - A Benchmarking Study of 100 Companies*,
 - available at: <http://www.ceres.org/Document.Doc?id=547>

Key water disclosure studies (2010 – prior)

- Carbon Disclosure Project. (2010), *CDP Water Disclosure 2010 Global Report*,
 - available at: <https://www.cdproject.net/CDPResults/CDP-2010-Water-Disclosure-Global-Report.pdf>
- Egan, M. and Frost, G. R. (2010), *Corporate water reporting: A study of the Australian food, beverage and tobacco sector*,
 - available at: <http://www.google.com.au/url?sa=t&source=web&cd=1&ved=0CCMOFjAA&url=http%3A%2F%2Fwww.cpaustralia.com.au%2Fcps%2Fde%2Fxbcr%2Fcpa-site%2FCorporate-water-reporting.pdf&ei=PXDLTcexDZHrQeig42HBA&usq=AFQjCNE6C34qEGnl8ePZUVHbCYeCUIxPw>
- Morrison, J. and Schulte, P. (2009), *Water Disclosure 2.0 - Assessment and Emerging Practice in Corporate Water Reporting*,
 - available at: http://www.unglobalcompact.org/docs/news_events/9.1_news_archives/2009_03_11/Water_Disclosure.pdf
- Prior, E. (2009), *Water Challenges for ASX100 Companies - Adapting to Increasing Water-Related Risks*,
 - available at: <https://http://www.citigroupgeo.com/pdf/SAU06080.pdf>
- Morikawa, M., Morrison, J. and Gleick, P. (2007), *Corporate reporting on water*,
 - available at: http://www.pacinst.org/reports/water_reporting/

Australian water reporting studies

Prior (2009) reviewed exposure to water risk by ASX 100 companies

- Found that key risk was access, not price
- Difficult to find data for many companies

ACCA (2010) reviewed disclosures by 32 of the largest Australian companies:

- Even for these very large companies, room for improvement on disclosure of water-related risk issues and risk management across the supply chain - called for a common standard on water disclosure.

Egan and Frost (2010) reviewed Australian food and beverage companies:

- Increasing awareness of water issues, but also a lack of basic disclosures of water inflows and outflows - Company structure (in relation to the public/private divide) is cited as a possible explanation.

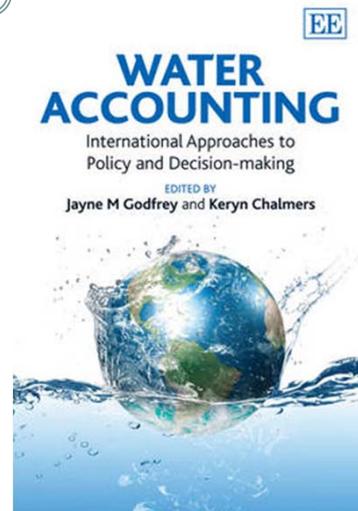
Godfrey and Chalmers: Water Accounting

Godfrey & Chalmers (2012).
Water Accounting

- Physical copy or Google Books

Chapter topics include:

- National water accounting
- UN statistical accounting
- Mining
- Water footprint reporting
- Country case studies
& more!



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Water accountants

Water information managers come from many disciplines:

- Site scale data is usually collated by engineers or water bureaucrats.
- Corporate data is usually collated by 'sustainability' staff.
- Accountants don't play much of a role.
 - They work for private sector water suppliers and users, state and Commonwealth water agencies, and consulting firms.
 - So they all collect and collate water information a little differently.

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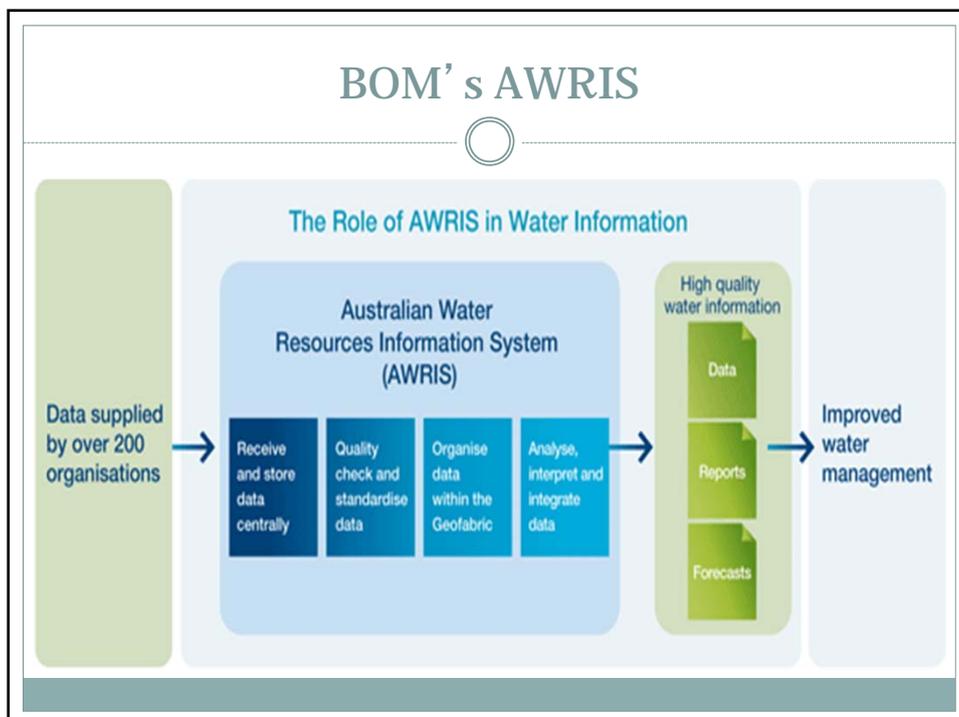
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Water data collection

One part of water information management is the collection of data.

BOM has become the main public coordinating body for this nationally.

- BOM operate AWRIS, the Australian Water Resources Information System.
- BOM operate the WASB.
- BOM also prepare the National Water Account.



BOM's National Water Account



National Water Account 2010



see Water Accounting
Standards Board at

[http://www.bom.gov.au/
water/standards/wasb/](http://www.bom.gov.au/water/standards/wasb/)



Definitions

water accounting statements	Include the Statement of Water Assets and Water Liabilities, the Statement of Changes in Water Assets and Water Liabilities, and the Statement of Water Flows.
water asset	<i>Water</i> , or the rights or other claims to <i>water</i> , which the <i>water report entity</i> holds or transfers, and from which the <i>water report entity</i> , or stakeholders of the <i>water report entity</i> , derive future benefits.
water entity	An entity that: <ol style="list-style-type: none"> holds or transfers <i>water</i>; or holds or transfers rights or other direct or indirect claims to <i>water</i>; or has inflows and/or outflows of <i>water</i>.
water liability	A present obligation of the <i>water report entity</i> , the discharge of which is expected to result in a decrease in the <i>water report entity's water assets</i> or an increase in another <i>water liability</i> .

Statement of Water Assets and Water Liabilities for Testcorp as at 30 June 2X11

	Notes	2X11 ML	2X10 ML
WATER ASSETS			
Surface water assets			
Catchment and unregulated storage		455 000	325 000
Regulated river storage		1 650 000	1 550 000
Utility network storage		70 000	50 000
Total surface water assets		2 175 000	1 925 000
Groundwater assets			
Groundwater storage		255 000	250 000
Total groundwater assets		255 000	250 000
Other water assets			
Claims to water: intervalley		30 000	30 000
TOTAL WATER ASSETS	2	2 460 000	2 205 000
WATER LIABILITIES			
Allocation water liabilities		150 000	100 000
Other water liabilities		30 000	30 000
TOTAL WATER LIABILITIES		180 000	130 000
NET WATER ASSETS		2 280 000	2 075 000
Net water assets at beginning of reporting period			
		2 075 000	2 600 000
Change in net water assets			
	1	205 000	(525 000)
NET WATER ASSETS		2 280 000	2 075 000

Statement of Changes in Water Assets and Water Liabilities for Testcorp
for the year ended 30 June 2X11

	Notes	2X11 ML	2X10 ML
Changes in water assets			
Water asset increases		1 425 000	660 000
Water asset decreases		(1 170 000)	(1 135 000)
Net change in water assets		<u>255 000</u>	<u>(475 000)</u>
Changes in water liabilities			
Water liability increases		180 000	180 000
Water liability decreases		(130 000)	(130 000)
Net change in water liabilities		<u>50 000</u>	<u>50 000</u>
Change in net water assets	1	<u>205 000</u>	<u>(525 000)</u>

Statement of Water Flows for Testcorp
for the year ended 30 June 2X11

	Notes	2X11 ML	2X10 ML
Water inflows			
Surface water inflows		1 500 000	800 000
Groundwater inflows		55 000	20 000
Net surface water flows		<u>1 555 000</u>	<u>820 000</u>
Water outflows			
Surface water outflows		1 250 000	1 150 000
Groundwater outflows		50 000	65 000
Net groundwater flows		<u>1 300 000</u>	<u>1 215 000</u>
Net change in water storage	1	255 000	(395 000)
Opening water storage		<u>2 175 000</u>	<u>2 570 000</u>
Closing water storage	2	<u>2 430 000</u>	<u>2 175 000</u>

Note 1: Reconciliation of Change in Net Water Assets to Change in Water Storage

	2X11 ML	2X10 ML
Change in net water assets	205 000	(525 000)
Adjustments for:		
(Decrease)/increase in accruals		
Allocation water liabilities	50 000	100 000
Claims to water: intervalley	0	30 000
	<u>50 000</u>	<u>130 000</u>
Net change in water storage	255 000	(395 000)

**Note 2: Reconciliation of Closing Water Storage to Total Water Assets**

	2X11 ML	2X10 ML
Closing water storage	2 430 000	2 175 000
Comprises:		
Surface water assets	2 175 000	1 925 000
Groundwater assets	255 000	250 000
	<u>2 430 000</u>	<u>2 175 000</u>
Other water assets	30 000	30 000
Total water assets	2 460 000	2 205 000



Stakeholders' Perspectives on Standardised Water Accounting Reports: Accountability Perspective

Dr Edward Tello
Professor Lorne Cummings
Mr James Hazelton

Rationale

- There is a water crisis worldwide. One of the drivers of the current crisis is water misuse due to water mismanagement.
 - One of the solutions for this crisis is to improve water management, but how?
- Standardised Water Accounting (hereafter SWA) is a useful tool to improve water information
 - By having better water information, water management can be improved
- Therefore, a main aspect to look at is *accountability*. Overall, does SWA enhance the accountability of water managers?

Rationale

- In this paper, the perspectives of potential users of water accounting reports regarding SWA (reflected on ED AWAS 1) are investigated
 - Research Question: To what extent do users perceive Standardised Water Accounting (SWA) reports, under the Exposure Draft of Australian Water Accounting Standard 1 (ED AWAS 1), as useful for discharging the accountability of water managers?
- The Water Accounting Project (under the Water Accounting Standards Board WASB) was part of Ed Tello's PhD.

Table 1. Evolution of Standardised Water Accounting (SWA)

2004	National Water Initiative (NWI) is an intergovernmental agreement reached by the Council of Australian Governments (COAG)
2006	Sinclair Knight Merz (SKM) is commissioned by the Department of Agriculture, Forestry, and Fisheries to undertake a stocktake and analysis of the water accounting practice in Australia
2006	On November 24 th , the National Water Accounting Development Project (NWADp) was endorsed by the Natural Resource Management Ministerial Council (NRMCMC)
2007	In February, the Water Accounting Development Committee (WADC) was established
2007	State pilot projects were established (until 2009)
2007	The Water Act 2007 is signed. The Bureau of Meteorology (BoM) was assigned the task of issuing National Water Information Standards
2008	WADC is assigned under BoM's responsibility
2008	The Water Accounting Standards Board (WASB) superseded the WADC
2009	The Water Accounting Conceptual Framework (WACF) and the Preliminary Australian Water Accounting Standard (PAWAS) are issued
2009	Water Reform Committee replaced COAG Working Group on Climate Change: Water Subgroup
2010	The Exposure Draft of the Australian Water Accounting Standard (ED AWAS 1) is issued by the WASB. Comments and feedback were received until June 2011

Standardised Water Accounting (SWA)

- SWA is defined by SKM (2006 p. 2) as ‘the application of a consistent and structured approach to identifying, measuring, recording and reporting information about water’
- An innovation in Australian water accounting is the trial of SWA which is water accounting that mimics financial accounting in methodology and presentation and is created in accordance with Water Accounting Standards

The National Water Account 2010 and 2011

- Under the Commonwealth *Water Act (2007)*, BoM has responsibility for compiling and delivering comprehensive water information across Australia
 - This includes publication of an annual National Water Account
- Water Accounting Conceptual Framework principles have guided the development of the Exposure Draft of Australian Water Accounting Standard 1 (ED AWAS 1), which is underpinning the production of the National Water Account (NWA) 2010 and 2011
- The NWA provides a valuable insight into the management of Australia’s water resources at the national & regional scale
- The NWA complements the ABS *Water Account, Australia* which provides information on the supply and use of water within the Australian economy

The National Water Account 2011

- The NWA 2011 reports on the 2010-11 water year and includes a set of sub-national water accounts for the regions of Adelaide, Canberra, Melbourne, Murray-Darling Basin, Ord, Perth, South-East Queensland and Sydney

National Water Account 2011				
Water Assets and Water Liabilities (ML)	Adelaide	Canberra	Melbourne	Murray-Darling B.
Water Assets:				
Surface water	120,570	239,752	1,126,164	22,857,405
Groundwater				
2.1 Water table aquifer	0	0	21,873	0
2.2 Underlying aquifers	0	0	16,565	0
2.5 Other groundwater assets	88,252	0		1,327,718
Urban water system	18,323	855	24,219	
Irrigation scheme	29			
Total Water Assets	227,174	240,607	1,188,821	24,185,123
Water Liabilities:				
Surface water liability	0	0	13,946	6,510,063
Groundwater liability				
6.1 Groundwater allocation remaining	3,561	0	0	1,958
6.2 GW allocation remaining - urban water system	0	0	0	0
Total water liabilities	3,561	0	13,946	6,512,021

Source: Bureau of Meteorology, 2012 (www.bom.gov.au/water/nwa/2011/index.shtml)



Introduction

- This study examines the perception of potential users of water accounting reports under SWA (reflected in ED AWAS 1).
- One outcome of previous research was that some practitioners were unsure of the precise user needs that would be met through the provision of water accounts and therefore whether benefits would exceed costs.
- Further, while the adoption of financial accounting techniques was considered helpful in some aspects, report preparers differed as to the extent to which they believed SWA reports would facilitate the discharge of water managers' accountability.



Theoretical Framework - Accountability

- The theoretical framework that drives this study is Accountability. Accountability is prescriptive in nature.
- Accountability for water is important because water usage is critical in Australia. Freshwater resources should be managed rationally and equally because they are not indefinite. In the case of Australia, the country is wet and dry at the same time which is due to the erratic rain patterns throughout the country

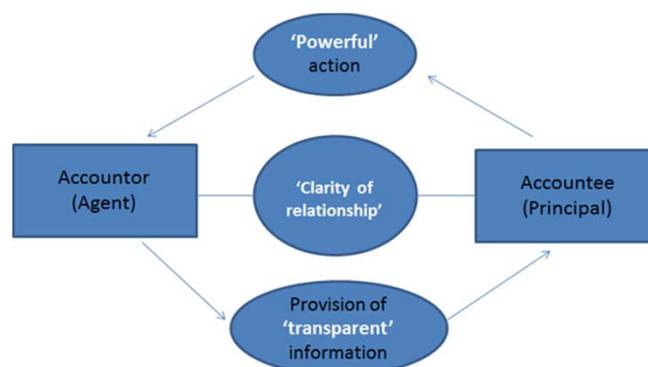
Theoretical Framework - Accountability

- Gray *et al.* (1996 p. 38) provide a broad definition of accountability as the *'duty to provide an account (by no means necessarily a financial account) or reckoning of those actions for which one is held responsible'*
 - Provide an account = **Transparency**
 - Actions for which one is held responsible = **Clarity of relationship** and **Power**
- Accountability is important in Accounting. After analysing different pieces of research ([Jones, 1977](#), [Stewart, 1984](#), [Sinclair, 1995](#), [Gray et al., 1996](#), [Llewelyn, 2003](#), [Cooper and Owen, 2007](#), [Messner, 2009](#), [Roberts, 2009](#), [Smyth, 2012](#), [McKernan and McPhail, 2012](#), [Joannides, 2012](#), [Barton, 2006](#), [Kamuf, 2007](#), [Lowe et al., 2012](#), [Gibbon, 2012](#), [Roberts, 1991](#), [Spence et al., 2010](#), [Shaoul et al., 2012](#), [Bovens, 2005](#), [Zyglidopoulos and Fleming, 2011](#), [Brennan and Solomon, 2008](#)), an integrated accountability model was developed.

Theoretical Framework - Accountability

- It is argued that accountability goes beyond the mere provision of accounts because it involves analysing the relationship of the actors involved in the provision of information. That relationship must be clearly identified. Such information is meant to be transparent (and should be reflected in the quality of reporting) and should empower accountees
- Therefore, for the purposes of this integrated model, accountability includes the notions of *clarity of relationship* (between the accountant and the accountee), *transparency* (related to access to information) and *power* (which is circumscribed only to the power of the accountee over the accountant)

Theoretical Framework - Accountability



Research Method

- Mixed method approach
- The quantitative part was a survey. A questionnaire was delivered to potential users of water accounting reports who attended 5 different water-related events. Respondents represent users with a water-related interest. In total, 36 questionnaires were completed (which represented approximately 21% of the attendees of those events)
- Survey questions included:
 - *To what extent do you think the benefits of the water accounting reports will exceed the costs of preparation for community users?*
 - *Do you think that all material contained in the General Purpose Water Accounting Reports excluding the accountability statement provides a mechanism to specifically assess the performance of water managers?*
 - *Do you think that the material contained in the Accountability Statement provides a mechanism to specifically assess the performance of water managers?*



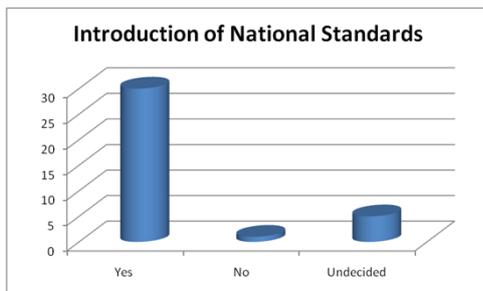
Research Method

- The qualitative part was an analysis of public submissions to the Water Accounting Standards Board on ED AWAS 1 (publicly available since November 2011). Only submissions from users were chosen to keep consistency. In total, 23 submissions were downloaded from the BoM's website. Of the 23 submissions, 9 were from potential report preparers; therefore, the final sample was comprised of 14 submissions.
 - These submissions were coded and analysed using Nvivo



Findings – Quantitative Phase

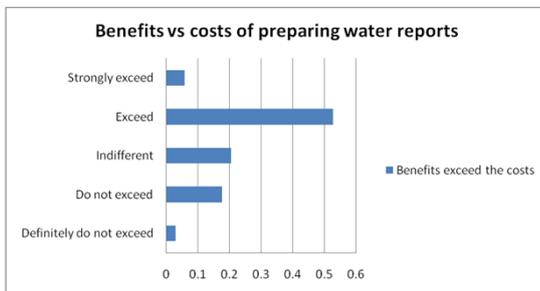
Introduction of national standards to prepare water reports



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Findings – Quantitative Phase

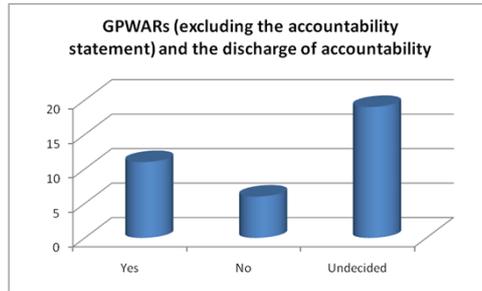
Benefits versus costs of preparing water accounting reports



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Findings – Quantitative Phase

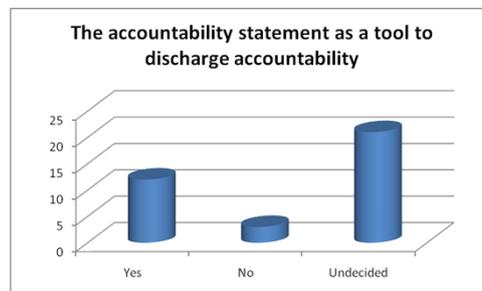
General Purpose Water Accounting Reports (excluding the accountability statement) and the discharge of accountability



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Findings – Quantitative Phase

The accountability statement as a tool to discharge accountability



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Findings – Qualitative Phase

- Clarity of relationship:
 - One of the issues mentioned by the respondents is their struggle to differentiate between the water entity and the water report entity. Sometimes both of them are the same, but other times they are not

'(...) the fundamental difficulty is the confusion in the definition of a water report entity between: (1) Water and rights to water (the WHAT) and (2) Organisations that are responsible for managing water and/or preparing water accounts (the WHO)' (submission 4)

Findings – Qualitative Phase

- Clarity of relationship:
 - Going to the other side of the coin, almost all respondents agree with the idea of satisfying the information needs of users via the content of water accounting reports. Users are the accountees in the relationship
 - The difficulty is to state who the potential users are (accountees) and what their information needs are

Findings – Qualitative Phase

- Transparency:
 - Reporting is used as a proxy for transparency in the integrated accountability model. Being the submissions on ED AWAS 1, the majority of questions are on reporting and the mechanisms of reporting. Out of the 54 questions, 22 questions were selected. Those questions are based on the 7 components of the ED AWAS 1.
 - It is clear for the majority of respondents that the main objective of GPWAR is to convey water information for users. Some suggest adding extra information such as the inclusion of water market participants

Findings – Qualitative Phase

- Transparency:
 - In terms of the Statement of Water Assets and Liabilities, the Statement of Changes in Water Assets and Water Liabilities and the Statement of Physical Water Flows, all agree in terms of their importance and the information they convey; however, the majority consider that instead of 3 there could be only 2 because of the low number (or even inexistent) of accruals (water carryover and/or inter valley owed between river basins). Additionally, some respondents were hesitant about the use of the terms 'water assets' and 'water liabilities' and everything that they involve.

Findings – Qualitative Phase

- Power:

- Even though there is no specific question reflecting the power of accountees, all submissions were read carefully so as to identify some references to power. Maybe it is too early to assess whether GPWAR will empower accountees. Looking at power involves looking at respondents' perceptions about the objectives of GPWAR under ED AWAS 1. All relate GPWAR as an information tool only without any reference to the 'after'.

'The objectives are quite specific, for good reason. However in the interests of wider uptake of GPWA, it might be useful to add a softer objective of 'Provide general information about water resources in the entity' (submission 26)



Findings – Qualitative Phase

- Power:

- Two submissions mentioned the power of accountees about GPWAR prepared under ED AWAS 1 and related this power to the power to make decisions, but it is not clear whether those decisions are about creating any change. It is assumed users and decision makers are synonyms.

'Overall, we support the development of standards aimed at improving the consistency & comparability of information about water resources provided by water report entities. This should assist decision makers at all levels in both the public & private sectors' (subm. 2)



Conclusions

- When potential users of water accounting reports were surveyed it was found that the majority agreed with the idea of having national standards to prepare water reports and agreed with the idea that the benefits will outweigh the costs of preparing water reports; however, the majority of respondents were uncertain about the discharge of accountability of such reports
 - These issues may explain why for the National Water Account 2010 and 2011 an accountability statement was not prepared

Conclusions

- Overall, it was found that at this stage users do not believe that SWA, reflected in ED AWAS 1, will discharge the accountability of water managers. This conclusion was reached after analysing the responses to the question in relation to the elements of the integrated accountability model
- Based on the perception of potential users of General Purpose Water Accounting Reports, the study suggests that accountability of water managers is unlikely to be fully realised

Contact details



Lorne Cummings, Macquarie University, Sydney

- p: 02 9850 8531
- e: lorne.cummings@mq.edu.au

James Hazelton, Macquarie University, Sydney

- p: 02 9850 8486
- e: james.hazelton@mq.edu.au