Environmental-Economic Accounting in Australia

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Wealth Accounting and Valuation of Ecosystem Services Partnership Meeting
The World Bank
Washington DC USA
Outline of presentation

• Background to recent Australian Government interest in environmental accounting

• ABS work on environmental-economic accounting and the application of the System of Environmental Economic Accounting (SEEA) to land and water

• How ecosystem accounting is being advanced in Australia at a range of levels
Acknowledgements

• Gary Stoneham and Mark Eingeramm (Victorian Government)
• Jane McDonald (Wentworth Group/Queensland University)
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• Phil Gibbons, David Lindenmayer, Judith Adjani and Brendan Mackay (Australian National University)
• Paul Lawrance (Queensland Government)
• Peter Greig (Chair NRM environmental accounting technical committee)
• Mark Lound, Valdis Juskevics, Andrew Cadogan-Cowper, Peter Comisari, David Skutenko (ABS)
We need better data for environmental decision-making

Australian 2006 State of the Environment report:

“The current environmental data reporting system has a plethora of players with little or no incentives for agencies and organisations to collaborate in the collection, management and sharing of specific data.”

Also known as the Hawke Review.

Chapter 19 is devoted to national environmental accounts

Recommendation 67 (1) of the EPBC Act Review

The Review recommends that the Australian Government, in the interests of promoting ecologically sustainable development, develop a system of environmental accounts to:

(a) establish baseline national environmental information;
(b) provide capacity to systematically monitor changes in the quality of the Australian environment;
(c) provide an information basis for improved regional planning and decision-making; and
(d) provide a secondary objective of strengthening the capacity of local government land-use planning decision-making.
Audiences for information: indicators, accounts and data

- Data users
  - Decision makers & wider public
  - Managers and analysts
  - Researchers

- Indicators
  - SEEAW
  - Standard tables
  - Supplementary tables

- Data items

Information

Headline indicators

Indicators on specific subjects or industries

Advice
An Integrated Environmental-Economic Information System for Australia

Researchers, Non-government organisations

Socio-economic

Bio-physical

Treasury, ABS, ABARES, PC, DRET, DEEWR

DSEWPaC, BoM, DCCEE, Geoscience Australia, MDBA, ABARES, CSIRO,

Department of Prime Minister and Cabinet
History of environmental accounting at the ABS

• ABS commenced environmental-economic accounting in the early 1990s
  – Developing monetary estimates for environmental assets within the scope of the SNA
  – A program of environmental-economic accounts within the environmental statistics area

• Dedicated team working on environmental-economic accounts (Staff: 9 water, 5 energy, 5 land, 3 green economy/environment industry, 2 solid waste and EPE, 2 SEEA revision)
  – Strong working relationships between the environmental-economic accounts team, national accounts and survey areas

• Extensive involvement in the SEEA 2003 and SEEA rev
## Past ABS environmental accounts

<table>
<thead>
<tr>
<th></th>
<th>Stock</th>
<th>Flow</th>
<th>Environmentally-related transactions</th>
<th>Adjusted SNA aggregates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>☑️ Artificial reservoirs only</td>
<td>☑️ Physical, Monetary and Emissions</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Energy</td>
<td>☑️ Physical and Monetary</td>
<td>☑️ Physical, Monetary and Emissions</td>
<td></td>
<td>☑️</td>
</tr>
<tr>
<td>Minerals</td>
<td>☑️ Physical and Monetary</td>
<td>☑️ Physical only</td>
<td></td>
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<td>Fish</td>
<td>☑️ Physical only</td>
<td>☑️ Physical only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste</td>
<td></td>
<td></td>
<td></td>
<td>☑️</td>
</tr>
<tr>
<td>Air</td>
<td></td>
<td>☑️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biodiversity</td>
<td></td>
<td>☑️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil</td>
<td></td>
<td>☑️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land</td>
<td>☑️ Monetary and physical</td>
<td></td>
<td></td>
<td>☑️</td>
</tr>
</tbody>
</table>
It is not the first time you produce data that is important

It is the 10th time or better still the 50th!
Water Account, Australia
Australia – physical water supply and use, 2008-09 (GL)

Key
- Wastewater
- Water
- Reuse water

Inland Water Resources

The Sea

Water Supply

Sewerage

Agriculture
- 3267
- 3626
- 515

Mining
- 143
- 715
- 334

Manufacturing
- 339
- 336

Electricity
- 228
- 44841
- 12
- 44984
- 93

Other industries
- 172
- 320

Households
- 9336
- 1594
- 944

* Note shown is the supply of distributed water and reuse water by mining and manufacturing, 25 GL in total.
Australia – monetary water supply and use, 2008-09 (million AUD$)

Key

Wastewater
Water
Reuse water

Inland Water Resources

Sewerage
ISIC 37

Water Supply
ISIC 36

Agriculture
ISIC 1

Mining*
ISIC 5-9

Manufacturing*
ISIC 10-33

Electricity
ISIC 35

Other ISIC 2,3,38,39, 45-99

Households

*Note shown is the supply of distributed water and reuse water by mining and manufacturing, 25 GL in total. No monetary available for these.
Monetary vs. physical use of distributed water (% of total use)

2008-09

- Households
- All other Industries
- Electricity
- Water Supply
- Manufacturing
- Mining
- Agriculture

Value of water

Volume of water
Australian average water prices for industry and households – $/kL

- **Households**: $1.93/kL
- **Agriculture**: $0.12/kL
- **Aust. Average**: $0.78/kL

<table>
<thead>
<tr>
<th>Industry</th>
<th>2004-05</th>
<th>2008-09</th>
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<tbody>
<tr>
<td>Agriculture</td>
<td></td>
<td>$0.12/kL</td>
</tr>
<tr>
<td>Mining</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other industries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Households</td>
<td></td>
<td>$1.93/kL</td>
</tr>
<tr>
<td>Aust. Average</td>
<td></td>
<td>$0.78/kL</td>
</tr>
</tbody>
</table>
Land as an asset

- Land has economic and non-economic values
- Nearly all economic activities involve the use of some land
- Land is a complex asset
Land value in Australia

- Total land value at 30 June 2010 was AUD$2,749 billion, up slightly from AUD$2,722 billion at 30 June 2009
- Rural land accounted for ~330 billion or ~12% of total land value
- At 30 June 2010 land represented 31% of all of total assets (= AUD$8,791 billion)
- At 30 June 2010 land represented 80% of all of natural resource assets (= AUD$3,397 billion)

From the Australia System of National Accounts
All values are in current prices
At 26 March AUD$ = 1.01 USD$
Billion = 1,000,000,000 or $10^9$
Australian GDP adjusted for depletion of subsoil assets and land degradation:

- For 2007-08 financial year was negative AUD$4,429 million

Photos: David Freudenberger from Greening Australia
Current ABS Plan for Integrated Environmental-Economic Accounts


- **Water Account**
  - (Annual, November 2011)

- **Energy Account**
  - (Annual, June 2011)

- **Land Account**
  - (1st Pilot February 2011)

- **Waste Account**
  - (2011?)

- **EPE Account**
  - (2012?)

- **Environment Industry Account**
  - (“green economy”)
  - (2013?)

- **National Accounts Data**

- **Natural resources on National Balance Sheet**
  - (Annual)
Pilot Land Account for the Great Barrier Reef Catchments

Land account integrated:
• Environmental data
• Economic data
• Social data
Data was spatial explicit
Great Barrier Reef
Statistical Area 1 regions

Survey forms included maps of individual land parcels
Land Account Outputs

Tables (NRM and GBR region)
• Land Use by Sector (hectares)
• Land Use by Sector (AUD$)
• Land Use classified by ACLUMP
• Dynamic Land Cover
• Vegetation cover 2006 and pre 1750
• Forest Extent and Change 1998 to 2008
• An interactive Google Earth® showing:
  – Counts of population (i.e. population) and businesses
  – Fire, temperature and rainfall
  – Rateable land value and land use
Land Value as recorded in government information system
2. Rateable value and Land use

2.1 Land use and rateable land value

<table>
<thead>
<tr>
<th>Data item</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of this SA1 region</td>
<td>3,123.6</td>
<td>Ha</td>
</tr>
<tr>
<td>Rateable Value</td>
<td>15.4</td>
<td>$m</td>
</tr>
<tr>
<td>Agriculture</td>
<td>52.8</td>
<td>%</td>
</tr>
<tr>
<td>RetailWholesale</td>
<td>2.1</td>
<td>%</td>
</tr>
<tr>
<td>Transport Storage</td>
<td>-</td>
<td>%</td>
</tr>
<tr>
<td>Industrial</td>
<td>0.9</td>
<td>%</td>
</tr>
<tr>
<td>Sport, Recreation, Accommodation</td>
<td>-</td>
<td>%</td>
</tr>
<tr>
<td>Community Services</td>
<td>3.3</td>
<td>%</td>
</tr>
<tr>
<td>Residential</td>
<td>14.6</td>
<td>%</td>
</tr>
<tr>
<td>Vacant Land - Urban</td>
<td>4.5</td>
<td>%</td>
</tr>
<tr>
<td>Vacant Land - Rural</td>
<td>0.2</td>
<td>%</td>
</tr>
</tbody>
</table>

Source: ABS
Complimentary Spatial & Temporal Data available in Queensland

Land valuations (QVAS) Statewide 2010/11
Land Use Mapping (QLUMP) 2009/10
Ground Cover Index (sub-annual)
Foliage projected cover (annual)
Wetlands mapping
Rural leasehold lands
Regional ecosystems mapping
Soil attributes, hazard and risk mapping
Measured experiments and monitored sites
Modelled data (paddock, sub-catchment & catchment)
Attendance at land management improvement workshops
Regional Body investment plans
Local council NRM improvement programs
Adding biodiversity to the pilot land account

• Biodiversity (or plant and animal species) is a component of ecosystems

• The ABS working with researchers at the Australian National University, the University of Queensland and the Bureau of Meteorology to investigate adding ecosystem/biodiversity and carbon stocks to the experimental land accounts.

• Species number and abundance is correlated with area and arrangement of native habitat (species area curve)

• This applied research should inform both the development of land accounts in Australia as well as the development of ecosystem accounts within the SEEA framework (i.e. SEEA Volume II)
Ecosystem accounting and
The SEEA Vol. II

Australian Government
State and Territory governments
Wentworth Group (Non-government organisation of scientists)
Trials in Natural Resource Management regions
SEEA Volume II and the Australian Bureau of Statistics
Australian Government

National Plan for Environmental Information

• Response to EPBC Report
• Work led by the Department of Environment (SEWPaC)
• Work just beginning
• Formation of the Australia Government Environment Information Advisory Group, Chaired by BoM
• Other development and review work is in planning
Victorian Government

- Trial land account to be produced by the ABS and Victorian Government
- Similar outputs to first trial in Queensland
- Possible addition of value for ecosystems:
  - Victoria has more than 1 million hectares of native vegetation on private land
  - Investigate the use of data from Bushtender/ecotender to get values for environmental goods and services
ecoTender in Victoria

• A market created by auctioning conservation contracts to landholders
  – Multiple environmental outcomes
  – Reveals supply price of environmental goods and services
  – Large investment in spatially referenced landscape information
  – Landscape information linked with scientific capability
    • Information about stocks and flows

• Other market schemes
  – Native Vegetation Exchange
  – BushTender
In 2008 the group produced a regionally-based model for environmental accounts. This model was created to provide:

- A mechanism to measure state and condition of our environmental assets and how they change over time,
- Information to underpin landscape and land use planning at all scales, and
- A system to guide better investment decisions in environmental management and repair.
Environmental assets will be measured using a reference condition benchmark - *The Econ.*

This will enable:

- Comparison of the relative state of one environmental asset with another,
- aggregate information at different scales and for different assets,
- account for environmental asset condition over time, and
- allows indicators of ecosystem condition to be selected for individual regional ecosystems rather than applying blanket indicators to the continent.
Regional environmental accounts: Trials by Natural Resource Management Groups

- Australia has 56 regional Natural Resource Management groups
- 9 of these will participate in a continent scale trial of building regional environmental accounts in 2011.
- The trials will use ecosystem indicators against a reference condition benchmark (i.e. The Wentworth Group concept) to measure the state and change in condition of their environmental assets.
- The first set of regional accounts will draw on existing data wherever possible to create the environmental (ecosystem) asset stock accounts, and use time series information to establish historical trend accounts.
- The stock accounts be based on a measure of ‘condition’ and quality, not just quantity.
- Each unique region will produce a terrestrial and aquatic ecosystem account
- The accounts will be comparable and able to build a set National Environmental Accounts, and draws expertise from academics, the ABS, BoM and other Commonwealth and State government agencies
NRM Trial Regions

1. Corangamite Catchment Management Authority, VICTORIA
2. Eyre Peninsula Natural Resources Management Board, SOUTH AUSTRALIA
3. North Central Catchment Management Authority, VICTORIA
4. Northern Agricultural Catchment Council, WESTERN AUSTRALIA
5. Northern Gulf Resource Management Group, QUEENSLAND
6. NRM North, TASMANIA
7. Queensland Murray-Darling Committee, QUEENSLAND
8. South East Queensland Catchments, QUEENSLAND
9. Namoi Catchment Management Authority, NEW SOUTH WALES
Contributions to SEEA Volume II on ecosystem accounting

• ABS will be an active participant in the Development of SEEA Vol II over 2011 and 2012.
• ABS is collaborating with academics from 2 universities and other national and state government agencies on contributions to Vol. II
Key issues for Australia

Defining, separately identifying and valuing
- ecosystem assets
- ecosystem goods and services

Increasing the application of accounts in decision-making
- Need potential users to better understand accounts

Building technical capability

Improving base data
Lessons from Environmental Accounting for Monitoring Biodiversity Conservation

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Biodiversity Conservation Strategy 2010 – 2030

“Outcome 3.3.1 - An increased representation of biodiversity and ecosystem services and goods within national accounts”
10 Lessons from Environment Accounting for Improving Biodiversity Monitoring

Lesson 1 – Build on the past
Lesson 2 – Must have sound institutional arrangements and legal basis
Lesson 3 – Learn by doing and accept what you have
Lesson 4 – Regular and ongoing beats infrequent and *ad hoc*
Lesson 5 – Need to build capacity
Lesson 6 – Integration of biodiversity data with other data is critical
Lesson 7 – Determining what to measure and how to measure it
Lesson 8 – Deciding how much is enough for effective monitoring
Lesson 9 – Ability to access and interpret data
Lesson 10 – Defining the questions and flexibility
References and contacts

ABS – www.abs.gov.au


ecoTender

Native Vegetation Exchange

Bushtender

Mark.E.Eigenraam@dse.vic.gov.au and Gary.Stoneham@dtf.vic.gov.au

Wentworth Group – www.wentworthgroup.org


pcosier@wentworthgroup.org (Peter Cosier) and jmcdonald@wentworthgroup.org (Jane McDonald)

Natural Resource Management Groups

Regional Environmental Accounts trial
peter.greig@ccma.vic.gov.au (Chair Technical Environmental Accounting Standards Committee)
Thanks for your attention

Questions?
What national environment accounts should provide (from EPBC Act Review, paragraph 19.30)

- Provide measurable ways of comparing and assessing environmental assets over time;
- Provide a practical base for investing in future actions for environmental assets;
- Provide information to underpin evidence based decision-making;
- Better target private and public investment at the program and project level;
What national environment accounts should provide (paragraph 19.30, continued)

- *Provide measurement and understanding of the impacts and effectiveness of policies and investments;*
- *Allow for better identification and management of risks;*
- *Provide greater community visibility on environmental outcomes;*
- *Guide environmental and land-use planning, including through environmental impact assessments and regional planning; and*
- *Identify and address gaps in reporting requirements and inform the SoE reporting process.*
In addition, national environment accounts should
(from EPBC Act Review, paragraph 19.32)

- Be based on scientifically robust measurements of specific indicators;
- Involve a standardised approach to data collection, management, monitoring and reporting;
- Involve collection, coordination and reporting at a regional scale; and
- Be established and maintained under enduring institutional arrangements with clearly defined roles and responsibilities for all levels of government.