A water account for Australia

Water Accounting workshop

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Australian Bureau of Statistics
Presentation outline

• Background - what are water accounts?
• Data sources
• Climate conditions
• Results
• Future work
What are water accounts?
At least two views:

• Water balance

• Supply-use framework
  – Physical water accounts
  – Monetary water accounts
  – Emission accounts
  – Hybrid and economic accounts
  – Asset accounts
  – Quality accounts……..
Water Balance

• Scientists and hydrologists are primarily interested in physical water balances in the environment.

• Stocks and flows of water into and out of water management areas.
Water Balance

The key elements in the water balance are:

- Storage at beginning of period
- Inflows
- Outflows
- Change in storage
- Storage at end of period
Water Balance

Inflows:
- Streamflow generated inflows from rainfall
- Groundwater inflows from rainfall
- Surface water inflows (from other entities)
- Groundwater inflows (from other entities)

Storages:
- Water stored in:
  - Soil water
  - Aquifers
  - Major on-stream storages
  - Minor on-stream storages etc...

Outflows:
- Surface flows to sea and unusable bodies
- Groundwater flows to sea and unusable bodies
- Surface water outflows (to other entities)
- Groundwater outflows (to other entities)

Source: www.water.gov.au
# Water Balance

<table>
<thead>
<tr>
<th>WMA Name</th>
<th>Opening storage volume</th>
<th>Closing storage volume</th>
<th>Surface water inflows</th>
<th>Groundwater inflows</th>
<th>Surface water outflows</th>
<th>Groundwater outflows</th>
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</thead>
<tbody>
<tr>
<td>New South Wales</td>
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<td>Gwydir Regulated</td>
<td>5,490</td>
<td>5,569</td>
<td>1,217</td>
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<td>1,142</td>
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<td>Richmond</td>
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<td>3,017</td>
<td>317</td>
<td>167</td>
<td>315</td>
<td>73</td>
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<td>Namoi Regulated</td>
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<td>20,419</td>
<td>1,011</td>
<td>173</td>
<td>1,080</td>
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<td>Lachlan Regulated</td>
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<td>76,784</td>
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<td>193</td>
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<td>210</td>
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<td>Murrumbidgee Regulated</td>
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<td>119,800</td>
<td>2,548</td>
<td>558</td>
<td>2,466</td>
<td>373</td>
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</tbody>
</table>

All volumes shown in GL

Source: www.water.gov.au
Supply-use Framework

- System widely used by statistical agencies to compile national accounts and various satellite accounts
  - Consistent with the international standard
- Looks at the flow of water from the environment into the economy and back again
- Can be integrated with other social and economic data
What is the ABS water account?

• The ABS Water Account is compiled according to the System of Integrated Environmental and Economic Accounts (SEEA)
What has the ABS Produced?

• Three editions released:
  – 1993-04 to 1996-97
  – 2000-01
  – 2004-05

• Four-yearly cycle

• An evolving and improved process each time

• Next release due in Dec 2010 in respect of 2008-09
Content of the latest ABS water account

- National level supply and use tables, 2000-01 and 2004-05
- State and territory supply and use
- Chapters that focus on certain industries and households – eg Agriculture, manufacturing and mining, households, water supply
- Water Stocks
- Water access, entitlements and trading
Data sources

• Large number of sources, including ABS survey data and other sources

• Stocks
  – Geoscience Australia
  – Bureau of Rural Sciences
  – Bureau of Meteorology
  – Industry associations
  – Australian National Committee on Large Dams
Data sources

Flows – supply and use

• The main ABS surveys used were:
  – 2004-05 Water Supply Survey
  – 2004-05 Agricultural Survey
  – 2004-05 Mining and Manufacturing Surveys
  – 2004-05 Electricity Generators Survey of Water Use
  – 2004-05 Service Industries Survey (including sporting and horse and dog racing associations)
Putting the data in context

- Rainfall
- Runoff
- Dam storage levels
- Area irrigated
Rainfall

• Water supply and use needs to be viewed in the context of Australia’s climate
• 2004-05 was a dry year compared with 2000-01
• Drought or below average rainfall was experienced in many parts of Australia
Percentage of Mean Annual Rainfall

1998-99 to 2000-01

2002-03 to 2004-05

Source: Bureau of Meteorology 2006
Water Stored in Large Dams

2001

2005

Percent of total capacity
2001 – 2004

- 80 – 100
- 60 – 80
- 40 – 60
- 20 – 40
- 0 – 20
- No data
1. Supply and Use of water
## Water supply and use, Australia – 2004-05

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<thead>
<tr>
<th></th>
<th>Supply (GL)</th>
<th></th>
<th>Use (GL)</th>
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<tr>
<td></td>
<td>Self-</td>
<td>Distributed</td>
<td>Reuse</td>
<td>Regulated discharge</td>
<td>Self-</td>
<td>Distributed</td>
<td>Reuse</td>
<td>In-stream</td>
<td>Consumption</td>
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<td>Agriculture</td>
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<td>-</td>
<td>na</td>
<td>6,582</td>
<td>5,329</td>
<td>280</td>
<td>-</td>
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<td>Mining</td>
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<td>12</td>
<td>0.2</td>
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<td>529</td>
<td>72</td>
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<td>341</td>
<td>13</td>
<td>-</td>
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<td>Electricity &amp; gas</td>
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<td>154</td>
<td>7,471</td>
<td>59,924</td>
<td>60,172</td>
<td>115</td>
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<td>59,867</td>
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<td>Water supply, sewerage &amp; drainage</td>
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<td>11,160</td>
<td>414</td>
<td>1,809</td>
<td>11,160</td>
<td>2,045</td>
<td>38,514</td>
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<td>2,083</td>
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<td>Environment</td>
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<td>1,005</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>79,784</strong></td>
<td><strong>11,337</strong></td>
<td><strong>425</strong></td>
<td><strong>62,455</strong></td>
<td><strong>79,784</strong></td>
<td><strong>11,337</strong></td>
<td><strong>425</strong></td>
<td><strong>60,436</strong></td>
<td><strong>18,767</strong></td>
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</tbody>
</table>
Water Use 2004-05

- Total water extracted – 79,784 GL
- Water used in-stream (almost all for hydro-electricity) – 60,436 GL
- Water providers extracted 11,337 GL, water users directly extracted 68,447 GL
- Water consumption was 18,767 GL, a decrease of 14% from 2000-01 when it was 21,703 GL
Water Consumption 2004-05

- Total water consumption - 18,767 GL
  - 65% by agriculture (12,191 GL)
  - 11% by households (2,108 GL)
  - 11% by water supply industry (2,083 GL)
  - 3% by manufacturing (589 GL)
  - 2% by mining (413 GL)
  - 1% electricity and gas (271 GL)
  - 6% all other industries (1,110 GL)
Agricultural Water Consumption 2004-05

- Water consumption by agriculture was 12,191 GL in 2004-05, a fall of 23% from 2000-01 when it was 14,989 GL.
- Decrease mostly in NSW (6,795 GL to 4,133 GL)
- The gross value of irrigated agricultural production in 2004-05 was 9.1 billion, down 5% from 2000-01 when it was 9.6 billion.
- The area of irrigated agricultural land decreased 8% between 2000-01 and 2004-05
Agricultural Water Use 2004-05

- Livestock etc
- Dairy
- Vegetables
- Sugar
- Fruit
- Grapes
- Cotton
- Rice

GL

2004-05
2000-01
Household water consumption

• Household consumption was 2,108 GL in 2004-05, a decrease of 8% since 2000-01

• Largest decrease was in ACT (15%) followed by South Australia (13%)

• 17% of households had rainwater tanks (48% of households in SA)

• 16 % reused or recycled water
Household consumption per capita
2004-05
Mining Water Consumption, 2004-05
Water Supply Industry, 2004-05

• In 2004-05 there were 413 water providers
• They supplied 11,337 GL of distributed water, a 12% decrease from 2000-01
• Surface water made up 10,712 GL or 96% of distributed water
• Distribution losses were 2,022 GL
• Water provided to the environment 1,005 GL
Number of water providers, 2004-05

- Major urban: 0
- Non-major urban: 5
- Minor urban: 100
- Irrigation/rural: 150
- Other (b): 200
- Other (b): 250
2. Stocks and water storage infrastructure

• In 2004-05
  – Rainfall estimate was 2,789,424 GL (below avg)
  – Run-off was 242,779 GL (below avg)
  – large dams had a capacity of 83,853 GL

• Large dams contained 39,959 GL at 30 June 2005, 48% of total capacity

• Water consumption in 2004-05 was 22% of storage capacity and 47% of the volume in storage at 30 June.
Large dam storage levels 30 June 2005
3. Entitlements and Trading

• There were 223,556 water access entitlements with a total entitlement volume of 29,831GL
• 13,456 temporary trades (1,053 GL)
• 1,802 permanent trades (248 GL)
• Most trades in Victoria
• The 1,301 GL traded represented 7% of water consumption and 4% of entitlement volume
Why are water accounts useful?

- Help our understanding of how water is used and how this use is changing over time
- Predicting future water needs
- Assessing impacts of water use:
  - Allocating water resources efficiently
  - Improving water efficiency
  - Understanding the impacts of water management on all users
  - Linking water availability to its use
THE BIG EIGHT WATER SCARCITY FACTORS

- Growing urban demand
- Drying and warming climate
- Irrigation demand
- Uncapped groundwater extraction
- Expanding farm dams
- Expanding plantations
- The environmental flows imperative
- Bushfire recovery impacts
Water Consumption

Water Consumption (ML)

- Agriculture
- Mining
- Manufacturing
- Electricity & gas
- Water supply
- Other industries
- Household

2000-01
2004-05
Why the central statistical agency?

• Measures of physical availability of water will soon be produced by the Australian Bureau of Meteorology

• However, ABS has expertise in collecting and disseminating data
  – especially economic data
  – and in integrating economic and other data, which is an important aim of SEEA type accounting
The future

- Demand for more timely and frequent information
- Demand for regional level data
- Demand for greater disaggregation of industry data
- Surface-ground water splits
- Development and application of water accounting standards
Thank you

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