Land and Ecosystem Accounts in South Africa
Mandy Driver (SANBI)

7th Annual WAVES Partnership Meeting
Kigali, 5-7 June 2017
SANBI – government agency under Ministry of Environmental Affairs

SANBI’s mandate includes:
- monitoring & reporting on the state of ecosystems
- providing science-based policy advice

Partnership between SANBI & Statistics South Africa to develop ecosystem accounts, initiated 2013

SA one of 7 pilot countries in Advancing Natural Capital Accounting (ANCA) (2014-2015)
What questions do ecosystem accounts answer?

• Identifying problems
  – Which ecosystem assets are in most rapid decline?
  – How are ecosystem services affected?

• Understanding the problem
  – What/who is driving the decline?

• Helping to target interventions and allocate resources to most important areas
**Pilot: Land and ecosystem accounts for KZN**

**KwaZulu-Natal (KZN)**
- 11 million people
- 16% of GDP
- Durban metro, major port, coal mining, steel production, sugar cane, fruit farming, crops, stock farming, timber plantations, ecotourism
- Large rural population, high poverty and unemployment levels

**Partnership with provincial conservation agency – Ezemvelo KZN Wildlife**
(47 detailed classes summarised to 16 classes for the accounts)
Vegetation types (~100) – good proxies for **ecosystem assets**

... nested within biomes →
### Physical account for land cover in KZN

<table>
<thead>
<tr>
<th></th>
<th>Natural</th>
<th>Degraded</th>
<th>Fallow lands</th>
<th>Timber plantations</th>
<th>Subsistence agriculture</th>
<th>Dryland cultivation</th>
<th>Irrigated cultivation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land cover 2005</strong></td>
<td>626488.4</td>
<td>641270.5</td>
<td>43114.2</td>
<td>664124.5</td>
<td>240491.5</td>
<td>251002.6</td>
<td>119379.9</td>
</tr>
<tr>
<td>Total additions to stock</td>
<td>0.0</td>
<td>176067.0</td>
<td>262889.9</td>
<td>66319.4</td>
<td>398723.8</td>
<td>67897.8</td>
<td>23290.0</td>
</tr>
<tr>
<td>Total reductions in stock</td>
<td>672172.8</td>
<td>118937.4</td>
<td>3742.8</td>
<td>23070.3</td>
<td>26965.0</td>
<td>100260.0</td>
<td>4162.5</td>
</tr>
<tr>
<td>Net additions (additions - reductions)</td>
<td>-672172.8</td>
<td>65726.8</td>
<td>22546.1</td>
<td>43248.1</td>
<td>371758.8</td>
<td>57871.9</td>
<td>19127.5</td>
</tr>
<tr>
<td>Net additions as % of opening land cover</td>
<td>-10.7</td>
<td>18.2</td>
<td>52.3</td>
<td>14.6</td>
<td>154.8</td>
<td>23.1</td>
<td>16.0</td>
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<tr>
<td>Total turnover (reductions + additions)</td>
<td>672172.8</td>
<td>287004.5</td>
<td>300317.7</td>
<td>89398.9</td>
<td>425688.9</td>
<td>77922.0</td>
<td>27452.6</td>
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<td>10.7</td>
<td>44.8</td>
<td>68.7</td>
<td>12.9</td>
<td>177.0</td>
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<td>23.0</td>
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<tr>
<td>No land cover change</td>
<td>5612715.6</td>
<td>5030330.0</td>
<td>393714.2</td>
<td>671055.5</td>
<td>2103526.5</td>
<td>240976.4</td>
<td>115217.4</td>
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<td>No land cover change as a % of opening LC</td>
<td>89.3</td>
<td>82.7</td>
<td>91.3</td>
<td>96.7</td>
<td>98.8</td>
<td>96.0</td>
<td>98.6</td>
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<td><strong>Land cover 2008</strong></td>
<td>5612715.6</td>
<td>706400.1</td>
<td>65660.3</td>
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<td>Total additions to stock</td>
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<td>Total reductions in stock</td>
<td>1269814.4</td>
<td>41473.8</td>
<td>3398.8</td>
<td>4595.7</td>
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<td>Net additions (additions - reductions)</td>
<td>-1268764.4</td>
<td>-334711.1</td>
<td>-1005.2</td>
<td>853.3</td>
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<tr>
<td>Net additions as % of opening land cover</td>
<td>-2.3</td>
<td>-4.7</td>
<td>-1.5</td>
<td>0.1</td>
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<tr>
<td>Total turnover (reductions + additions)</td>
<td>1270086.4</td>
<td>49476.6</td>
<td>5768.4</td>
<td>10044.8</td>
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<tr>
<td>Total turnover as a % of opening land cover</td>
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<td>7.0</td>
<td>8.8</td>
<td>1.4</td>
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<tr>
<td>No land cover change</td>
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<td>664926.2</td>
<td>62273.5</td>
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<tr>
<td>No land cover change as a % of opening LC</td>
<td>97.7</td>
<td>94.1</td>
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<td><strong>Land cover 2011</strong></td>
<td>5485839.2</td>
<td>672329.0</td>
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<td>738228.2</td>
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</tbody>
</table>

#### Key elements:
- Opening stock
- Additions to stock
- Reductions in stock
- Closing stock
What key changes are taking place in the landscape?

- Decline in natural vegetation
- Increase in subsistence agriculture
Subsistence agriculture

Photo: John Craigie, Ezemvelo KZN Wildlife
Which biomes are most at risk?

- Largest absolute decline in extent – Grassland biome (important role in water provision)
- Largest proportional decline in extent – Indian Ocean Coastal Belt

- Ecological function threshold at ~60%
- Extinction threshold at ~20%
Which municipalities are most affected?

- Subsistence agriculture
- Low density settlement
- Dryland cultivation
- Sugarcane
- Built-up areas
- Transport network

Policy uses:
- Land-use planning e.g. municipal Spatial Development Frameworks
- Summarise to sub-catchments to inform Catchment Management Strategies
Which ecosystem assets are most at risk?

A few examples – clear links to ecosystem services

- Conversion of alluvial wetlands (floodplains) and freshwater wetlands to subsistence agriculture, dryland cultivation and dams → Water quality impacts? Flood risk?
- Degradation of Subtropical Dune Thicket → Coastal storm risk?
- Degradation of Highveld Grassland → Major water source area for Durban

<table>
<thead>
<tr>
<th>Hectares</th>
<th>Vegetation type</th>
<th>Biome</th>
<th>Natural</th>
<th>Degraded</th>
<th>Fallow lands</th>
<th>Sugar cane</th>
<th>Severe erosion</th>
<th>Dams</th>
<th>Low density settlement</th>
<th>Turfed recreation areas</th>
<th>Built-up areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater Wetlands</td>
<td>Wetland</td>
<td>-8336</td>
<td>1039</td>
<td>563</td>
<td>3</td>
<td>2331</td>
<td>548</td>
<td>-1102</td>
<td>-193</td>
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<td>Southern Drakensberg Highland Grassland</td>
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<td>905</td>
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<td>30</td>
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<tr>
<td>Northern Drakensberg Highland Grassland</td>
<td>Grassland</td>
<td>-1744</td>
<td>1685</td>
<td>0</td>
<td>-13</td>
<td>-27</td>
<td>1</td>
<td>0</td>
<td>-68</td>
<td>64</td>
<td>-274</td>
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<tr>
<td>Subtropical Dune Thicket</td>
<td>OCB</td>
<td>-287</td>
<td>153</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>-11</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Links to socio-economic data

Direct dependence on rivers for water supply – land cover impacts on water quality?
Challenges for uptake of accounts

- Initial pilots provided proof of concept
- Lots of interest from potential users...
- ... Need further interpretation, communication and mainstreaming
- AND regular accounts
Challenges in building accounts

• Consistent time series data
• Building a technical team, including:
  – GIS and spatial analysis skills
  – Ecological understanding and interpretation
  – Mainstreaming and communications expertise
Next steps

• UNSD-led EU-funded project on NCA (2017 – 2019)
  – SA one of five pilot countries

• National GEF6 project on biodiversity & water security (2017-2021)
  – includes NCA component

• Development and implementation of national programme of work for ecosystem accounts

• Continued Stats SA - SANBI partnership
Pilot ecosystem accounting reports available at SANBI’s Biodiversity Advisor website

http://biodiversityadvisor.sanbi.org

(under “Planning and Assessment” section)
Policy uses of ecosystem accounts

- Land-use planning
  - e.g. municipal Spatial Development Frameworks
- Natural resource management
  - e.g. priorities for restoration
- Strategic development planning
  - e.g. understanding broader trade-offs
- Headline indicators
  - e.g. percentage turnover in land cover

Traditionally we use maps of biodiversity priority areas, but accounts have potential to reach a wider audience