Applying Natural Capital Accounting at the landscape scale: some early ideas and lessons from South Africa

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NCA Policy Forum
Kampala, 18 November 2019
Overview

• The landscape approach in South Africa
• Applying NCA at the catchment scale
  • Ecological Infrastructure for Water Security (EI4WS) project
  • Case study: Greater uMngeni catchment
• Five emerging lessons
The landscape approach has a long history in SA

- Multi-partner landscape-scale initiatives since early 2000s
- Global Environment Facility (GEF) funding has played a key role
  - CAPE (GEF 3), Grasslands Programme (GEF 4), Biodiversity & Land Use Project (GEF 5)
  - All have included landscape or catchment initiatives in some form
- Approach captured in *Biodiversity for Development* book

*South Africa’s landscape approach to conserving biodiversity and promoting ecosystem resilience*
Key characteristics of the landscape approach

- Production landscapes – mosaic of land uses
- Multiple partners across government, civil society and private sector
- Critical role of champions and communities of practice
GEF 6
Ecological Infrastructure for Water Security (EI4WS) project (2018 – 2022)

- Includes a component on natural capital accounting
- Includes work in two demonstration catchments
What is ecological infrastructure?

- Naturally functioning ecosystems that deliver valuable services to people
  - Narrower concept than “green infrastructure”
- Nature’s equivalent of built infrastructure
- Focus is on the underlying asset
- Several services can flow from one piece of ecological infrastructure
Ecological infrastructure supports and enhances built infrastructure

Ecological infrastructure ("above the dam")

Built infrastructure ("below the dam")
Degraded ecological infrastructure leads to reduced capacity and lifespan of dams, and increased maintenance costs.

Healthy ecological infrastructure such as intact rivers, wetlands and natural vegetation enhances investment in built infrastructure.
The concept of ecological infrastructure has gained a lot of policy traction in South Africa. Investing in ecological infrastructure is a cost effective development strategy that can deliver multiple benefits, including water security, food security, disaster risk reduction, climate change adaptation, job creation, rural development.
Accounts to be produced in Ecological Infrastructure for Water Security (EI4WS) project

Specifically aimed to support policy and decision making throughout the water value chain

→ Accounts can enable analysis of return on investment in water-related ecological infrastructure

National

Accounts for Strategic Water Source Areas – the 10% of land that delivers 50% of water

Sub-national

Demo catchments:
- Catchment-level water resource accounts
- Accounts for ecological infrastructure assets

accounts can enable analysis of return on investment in water-related ecological infrastructure
uMngeni catchment

• Supplies water to city of Durban: SA’s 3\textsuperscript{rd} largest city – major challenges with water quality & quantity

• Engineers have run out of conventional engineering solutions
High altitude grasslands – critical role in water provision
uMngeni Ecological Infrastructure Partnership (UEIP)

• Formed in 2013
  • More than 20 signatories, including Durban Metro, Umgeni Water, local municipalities, private companies (especially forestry), depts of water and agriculture, conservation authorities, SANBI, NGOs
• Focus on water security for Durban through investing in maintaining and restoring ecological infrastructure in greater uMngeni catchment
  • Including through strengthening institutional arrangements and knowledge
• Many co-benefits (e.g. disaster risk reduction, climate change adaptation)
How is NCA being applied in the uMngeni catchment?

• A step back up to NCA work at the national level....
Natural Capital Accounting & Valuation of Ecosystem Services (NCA&VES) project

Five pilot countries: Brazil, China, India, Mexico, South Africa
Newly in place: Basic Spatial Unit for NCA

BSU 1 (728 million 1 ha cells):
South Africa + EEZ + Transboundary basins

• Finalised June 2019
• 1 hectare grid
• Covers entire SA territory and EEZ
• Fixed point of origin, registered projection
• Any ecological, social or economic dataset can be linked to this grid
• Formal process for Stats SA custodianship as a strategic national dataset underway

BSU 2 (624 million 1 ha cells):
South Africa’s Prince Edward Islands + EEZ
Hot off the press: National Land Accounts

1990

- Built-Up: 2.5%
- Cultivation: 13.2%
- Natural or semi-natural: 84.3%

2014

- Built-Up: 2.6%
- Cultivation: 13.0%
- Natural or semi-natural: 84.4%
National Land Cover datasets for 1990 and 2014:
72 classes
30m, resampled to 100m BSU
How does land cover change relate to changes in population?
Census data also being linked to BSU layer to enable analysis

Change in built-up area (ha) by local municipality
1990 - 2014

% change in population by local municipality
1996 - 2011
-4 - 0
1 - 20
21 - 50
51 - 75
76 - 100
101 - 167
National **ecosystem asset accounts**: extent and condition

For terrestrial ecosystems
(vegetation types)

For river ecosystems
(quaternary river reaches)

1999

2011

All rivers (1999)

All rivers (2011)
NCA&VES project: Pilot ecosystem service accounts for KZN province

<table>
<thead>
<tr>
<th>Broad category</th>
<th>Ecosystem service</th>
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<tbody>
<tr>
<td>Provisioning</td>
<td></td>
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<tr>
<td>services</td>
<td>Harvested wild biomass</td>
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<td></td>
<td>Reared animal production</td>
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<td></td>
<td>Cultivated production</td>
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<tr>
<td>Cultural services</td>
<td>Experiential value associated with active or passive use</td>
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<td>Regulating services</td>
<td>Sediment retention</td>
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<td>Water quality amelioration</td>
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<td>Seasonal flow regulation</td>
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<td>Carbon sequestration</td>
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</tbody>
</table>
NCA&VES project: Pilot ecosystem service accounts for KZN province (physical and monetary)

Some initial results...

Led by Jane Turpie

Harvesting of wild resources

Reared animal production (commercial)

Reared animal production (communal)

Cultivation
**EI4WS project:** Catchment-level water resource accounts

- Using WA+ framework
- Hydrological modelling approach
- Strong land cover/use focus
  - Hierarchy of land cover/use classes, 1ha BSU grid

Led by David Clark
Water resource accounting outputs

Resource base sheet

Utilised flows sheet
Time series water resource accounts: Example for the uMngeni catchment
Maps of water-related ecological infrastructure including Strategic Water Source Areas, rivers and riparian zones, wetlands with high potential for specific ES.
Gathering spatial data on built infrastructure investments

Green dot = DBSA loan finance project

Umgeni Water: water treatment plants, pump stations, pipelines
What next?

• The challenge is not lack of data or even lack of natural capital accounts
• The challenge is to synthesise the various accounts and interpret them to create meaningful products for end users

→ We are using “accounting for ecological infrastructure” at the catchment scale as an organising framework to bring together:
  • National land accounts
  • National ecosystem asset accounts
  • Provincial ecosystem service accounts
  • Catchment-level water resource accounts
  • Social and economic data

• for application at the landscape level
Accounting for ecological infrastructure in demo catchments

MAPS of ecological infrastructure

Ecological infrastructure asset accounts
- El extent account
- El condition account

Ecosystem service accounts
- Ecosystem service supply & use
- Ecosystem service valuation

Supplementary accounts
- Expenditure on IEI
- Jobs created through IEI

Catchment water resource ACCOUNTS

Ecological infrastructure INVESTMENT PLANS
Many envisaged **uses and users** of accounts for ecological infrastructure...

**Examples of uses**
- Inform *Catchment Management Strategy*
- **Prioritise interventions to maintain and restore** ecosystems (e.g. wetland rehab, removing invasive species)
- Inform *farming practices* and agriculture programmes
- Inform *water use authorisations*
- Inform *land use planning*
- Inform *protected area expansion*
- Inform *project appraisal* for built infrastructure investments
- M&E e.g. of restoration efforts, including expenditure and socio-economic co-benefits such as jobs
- Calculate *return on investment* in ecological infrastructure
- Influence *municipal grant finance*

**Examples of users**
- Catchment Management Agency
- Dept of agriculture
- Dept of water and sanitation
- Water boards
- Municipalities
- Conservation authorities
- Development finance institutions
- Bulk infrastructure investors
- National Treasury

Will require iterative **co-production** between producers and users of accounts
Five emerging lessons

1. Don’t get stuck in the boundary trap
   • Accounts don’t necessarily have to be produced at the landscape scale to be used at the landscape scale
   • Accounts from a range of geographic levels (from national down) can be analysed and packaged for application at the landscape scale

2. Get your national BSU layer in place!
Five emerging lessons

3. Need iterative co-production of accounting outputs/interpreted products for application by managers and practitioners
   • Watch this space....

4. NSOs are not in the business of engaging with stakeholders at the landscape scale
   → Need boundary organisations at the accounts-policy-practice interface

5. Ecological infrastructure can be a useful organising concept/frame for bringing together stakeholders AND for bringing together various accounts
   • Including linking ecosystem accounting to socio-economic info at the landscape level