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& Data Science for Official Statistics

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Informing Climate Change and
Sustainable Development Policies
with Integrated Data

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Ecosystem services in the SEEA Ecosystem Accounting

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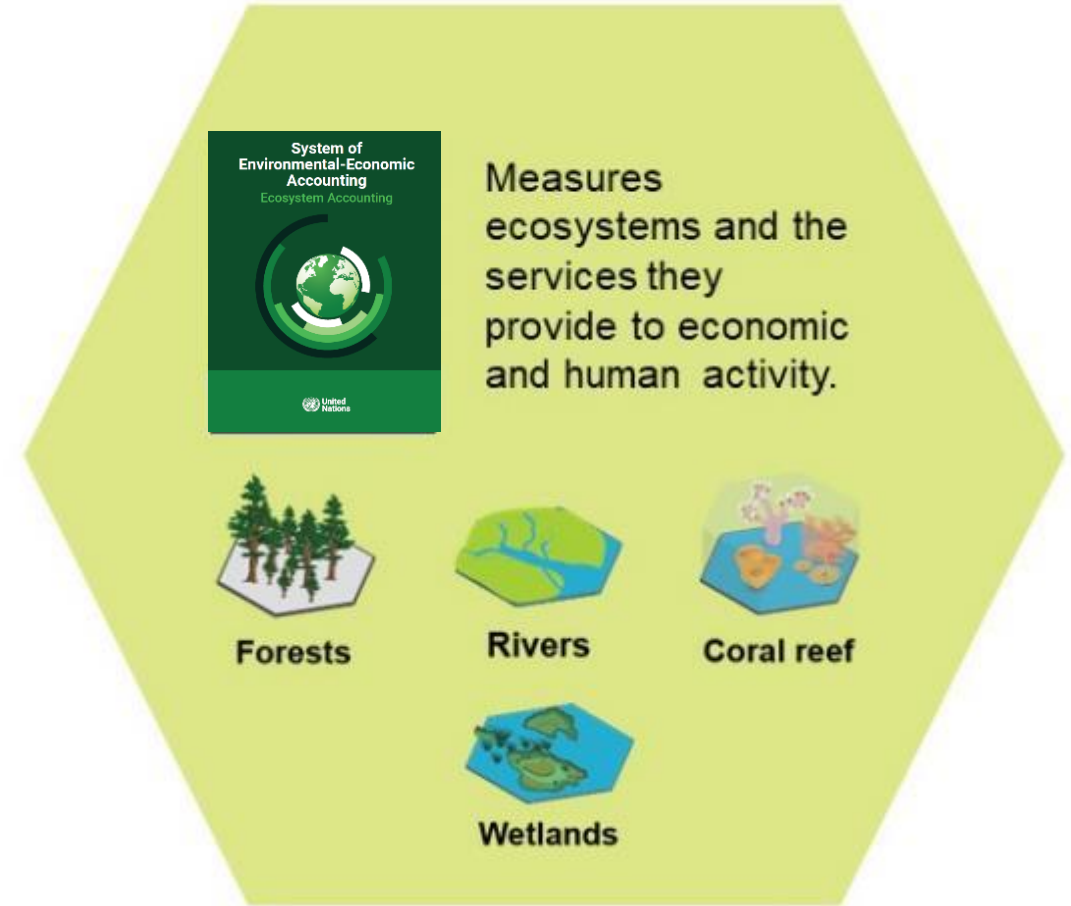


Outline

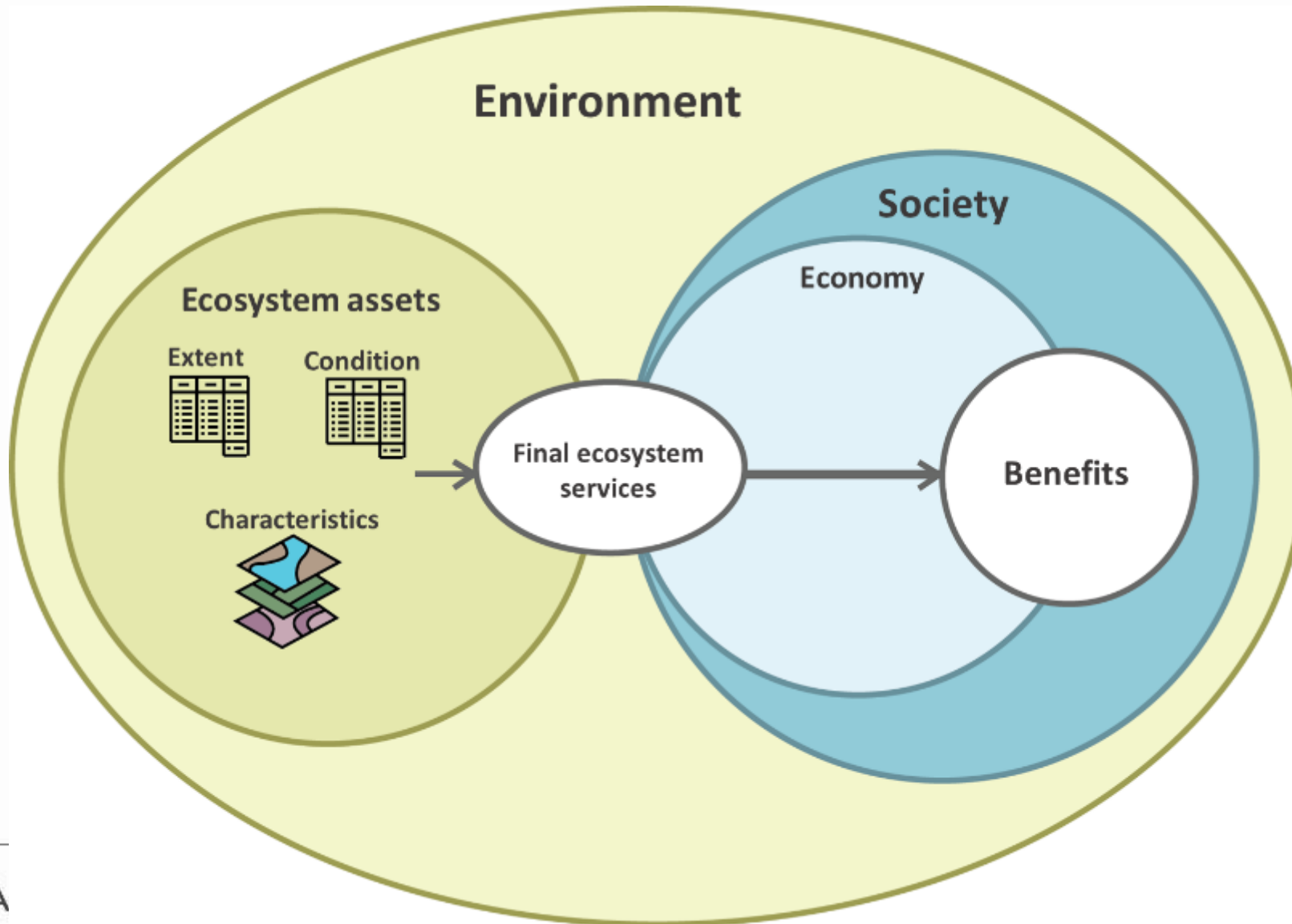
- The SEEA and the bigger picture
- SEEA Ecosystem Accounting conceptual framework and accounts
- What is the ecosystem services flow accounts
- Ecosystem services reference list
- Biophysical modelling of ecosystem services
- Materials in support of SEEA implementation
- Ecosystem services flow accounts: example from South Africa

SEEA Central Framework and SEEA Ecosystem Accounting

– Two sides of the same coin



SEEA Ecosystem Accounting - conceptual framework



SEEA EA Framework – Illustrative Example

1
Asset –
forest

2
Conditions



Soil depth



3
Services



Water
filtration



4
Benefits



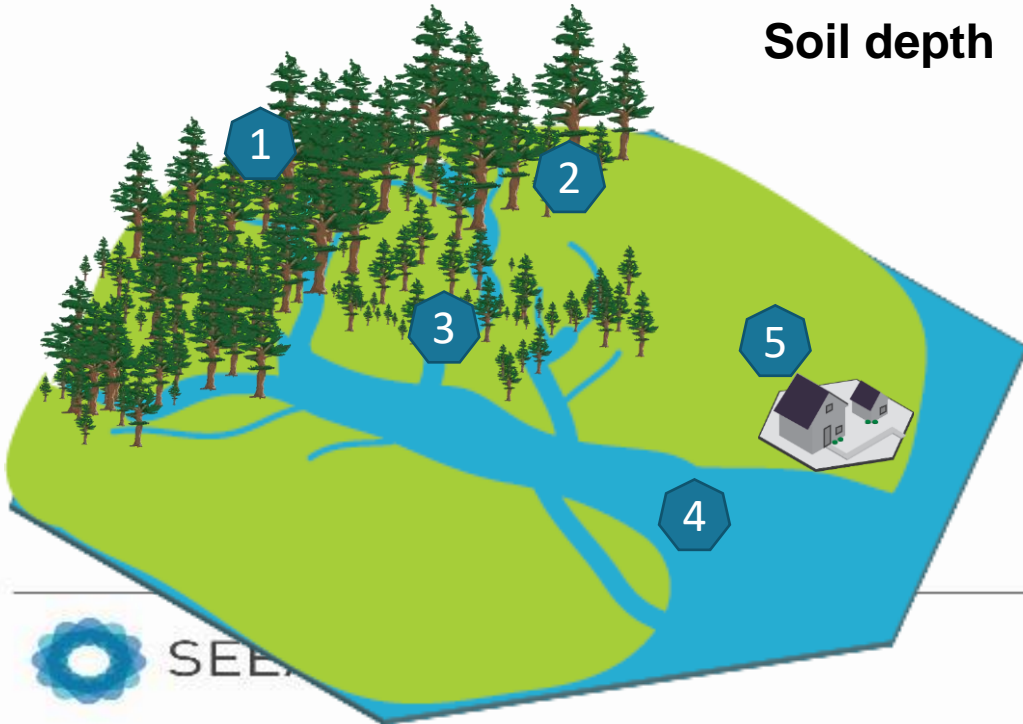
Clean water



5
Beneficiaries

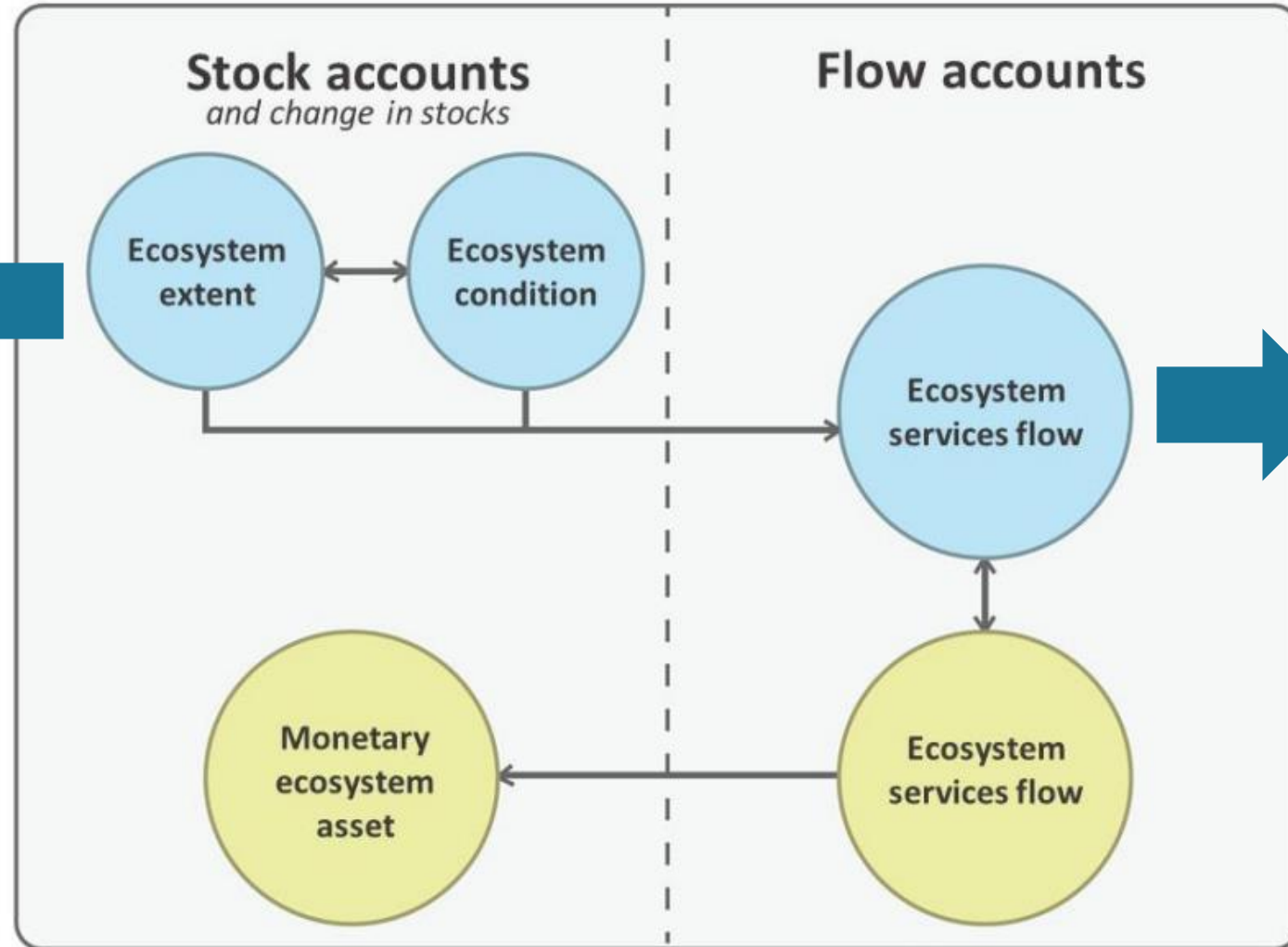


People



SEEA Ecosystem Accounting – core accounts and the GBF

Ecosystem extent account provides the basis for **Indicator A.2 Extent of natural ecosystems**



Ecosystem services account (physical) provides the basis for **Indicator B.1 Services from ecosystems**

Figure 2.2 from SEEA Ecosystem Accounting

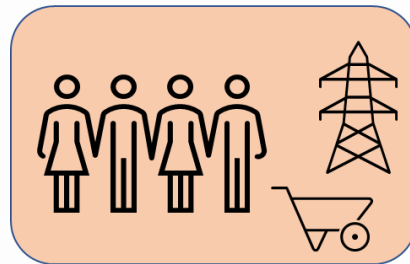
Ecosystem services flow account

- **Flows of ecosystem services** supplied by ecosystem assets and used by economic units (industries, households, government) during an accounting period
- **Alignment between supply and use** (i.e. supply needs to match use of a particular service)
- Both **physical and monetary units**

what ecosystems can provide



what humans (economy and society) need



Ecosystem Service Actual Flow

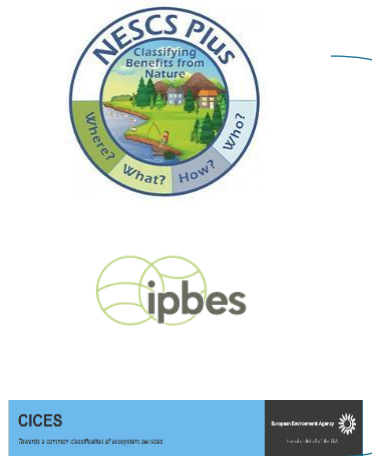
Supply table	ET 1	ET 2	...
ES 1			
ES 2			
ES ...			



Use table	Industries	Households	...
ES 1			
ES 2			
ES ...			

Ecosystem services

- SEEA EA includes a **reference list** of ecosystem services
- Final and intermediate ES



- Provisioning:
 - > Biomass
 - Grazed biomass
 - Livestock
 - Aquaculture
 - Wood
 - Wild fish + other
 - Wild animals, plants + other
 - > Genetic material
 - > Water supply
 - Cultural:
 - > Recreation-related
 - > Visual amenity
 - > Education, scientific and research
 - > Spiritual, artistic and symbolic services
 - Other ES
 - Non-use
- Regulating and maintenance services
 - > Global climate regulation
 - > Rainfall pattern
 - > Local (micro and meso) climate regulation
 - > Air filtration
 - > Soil quality regulation
 - > Soil and sediment retention
 - > Solid waste remediation
 - > Water purification
 - > Water flow regulation
 - > Flood control
 - > Storm mitigation
 - > Noise attenuation
 - > Pollination
 - > Biological control
 - > Nursery population & habitat maintenance

Biophysical modelling of ecosystem services

- What is biophysical modelling?
 - > Quantitative estimation of biophysical phenomena or processes that are difficult to fully observe directly
 - > Biophysical models are very useful for understanding ecosystem service supply
- Why do we need biophysical modelling?
 - > Data needed for ecosystem accounts not usually captured in regular data sources
 - > Measuring ecosystem services directly is often difficult or costly to measure in situ
 - > Data may only be available for specific locations
- Many modelling techniques are available, including look-up tables, spatial interpolation, geostatistical models, dynamic systems, etc.
- Many platforms are available for modelling ecosystem services, including AIRES, InVEST, INCA/ESTIMAP, etc.

Materials in support of implementation of the SEEA

Guidelines and reports

- Biophysical guidelines
- Monetary valuation
- Policy scenario analysis



E-Learning (in various language options)

- SEEA CF, including SEEA-Energy and SEEA-Water
- SEEA EA
- NCA Policy uptake

Data

- ARIES for SEEA



Policy applications

- Linkages of global indicators with SEEA
- How NCA contributes to sustainability policies



SEEA

Ecosystem services account: Example from South Africa

- Output of the EU-funded NCAVES project
- Modelled 11 different ES for 2005 and 2011 for Kwazulu-Natal (KZN) province
- Physical & monetary units

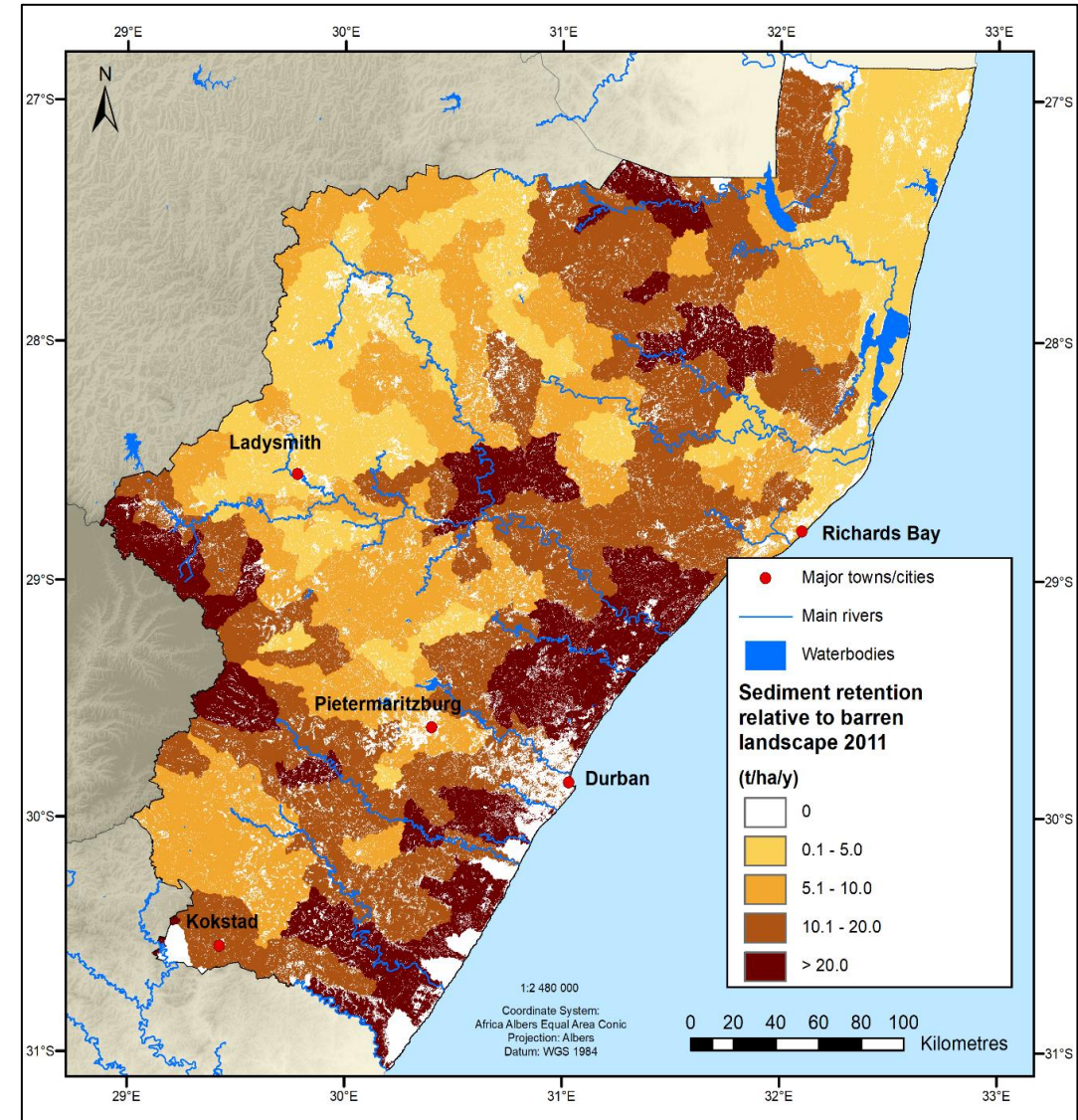
Towards a method for accounting for ecosystem services and asset value:
Pilot accounts for KwaZulu-Natal
South Africa, 2005-2011
Updated Final Report January 2021



Turpie, J.K., Letley, G., Schmidt, K., Weiss, J., O'Farrell, P. and Jewitt, D.



Picture representing:
Estimated average sediment retention by ecosystems per sub-catchment area in 2011 (tonnes per ha per year) relative to a barren catchment



Ecosystem services account: Example from South Africa (2)

- After integration, physical supply and use tables (and monetary SUTs + monetary asset account)

Table 5.1. Total biophysical supply per ecosystem type 2005

Resource	Biome	Freshwater ecosystems	Grassland	Indian Ocean Coastal Belt	Savanna	Forests	Estuaries	Cultivated	Urban green space	Total
Wood products (m ³)		3 523	695 638	235 125	787 294	267 047	169			1 988 796
Non-wood products (tonnes)		834	46 494	11 489	34 952	2 911	38			96 718
Livestock production (LSU)		1 716	684 698	52 162	289 663	2 010	340			1 030 589
Crop production (tonnes)								43 305 781		43 305 781
Experiential value (R millions)		14	237	179	218	55	24	85	885	1 698
Carbon storage (Tg C)		5	512	61	348	33	0	279		1 237
Pollination (R millions)		0	12	6	31	2	0			51
Flow regulation (million m ³)		78	3 315	421	2 198	634	36			6 682
Flood attenuation (R millions)									31	31
Sediment retention (million tonnes)		2	45	6	27	18	2			99
Water quality amelioration (tonnes P)		-	3 829	525	5 394	97	6			9 850

Source: Turpie et al. 2021

THANK YOU

seea@un.org // <https://seea.un.org/>

