

# ReLISA Work Package 1: ex ante Assessment of Restoration Opportunities

Tuesday 16<sup>th</sup> May 2023

Venue: CSIR International Convention Centre, Meiring Naudé Road, Brummeria, Pretoria

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# Outline

- Snapshot of Work Package 1
- International context for Natural Capital Accounting (NCA)
- UNEP's support to countries to apply NCA in policymaking
- South African context and experience
- Proposed activities under ReLISA Work Package 1
- Discussion

# Snapshot of Work Package 1

- Inform the selection of ecosystem restoration sites and methods based on scenario analysis of alternative policy interventions
- Further the development of ecosystem accounts in South Africa, to provide the necessary biophysical and monetary data on ecosystem service provision in service of ReLISA activities and beyond
- Capacity building and knowledge management

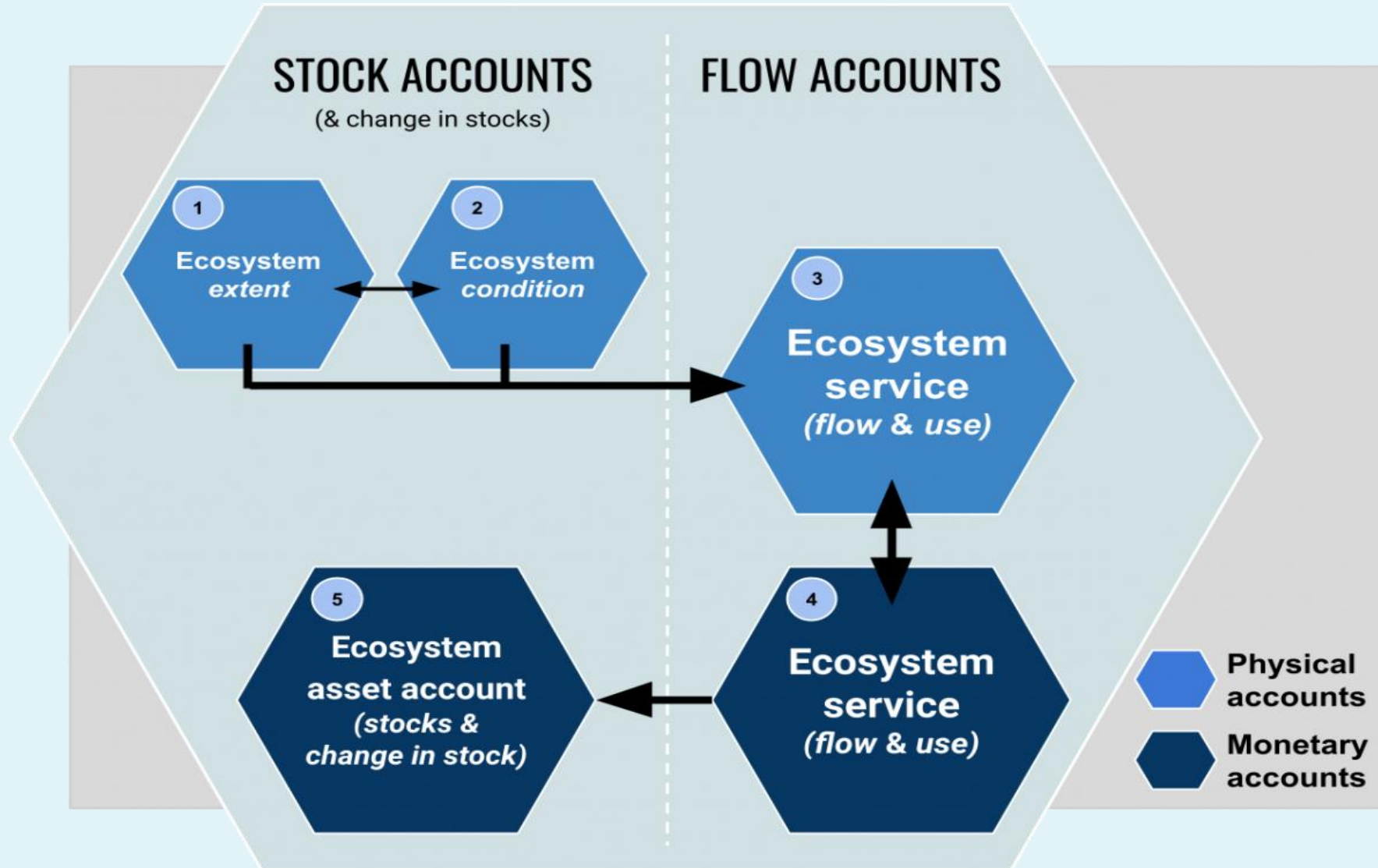
# SEEA EA (System of Environmental-Economic Accounting Ecosystem Accounting) – adopted internationally March 2021



*“By highlighting the contribution of nature, we now have a tool that allows us to properly view and value nature. It can help us bring about a rapid and lasting shift toward sustainability for both people and the environment.” Inger Andersen*

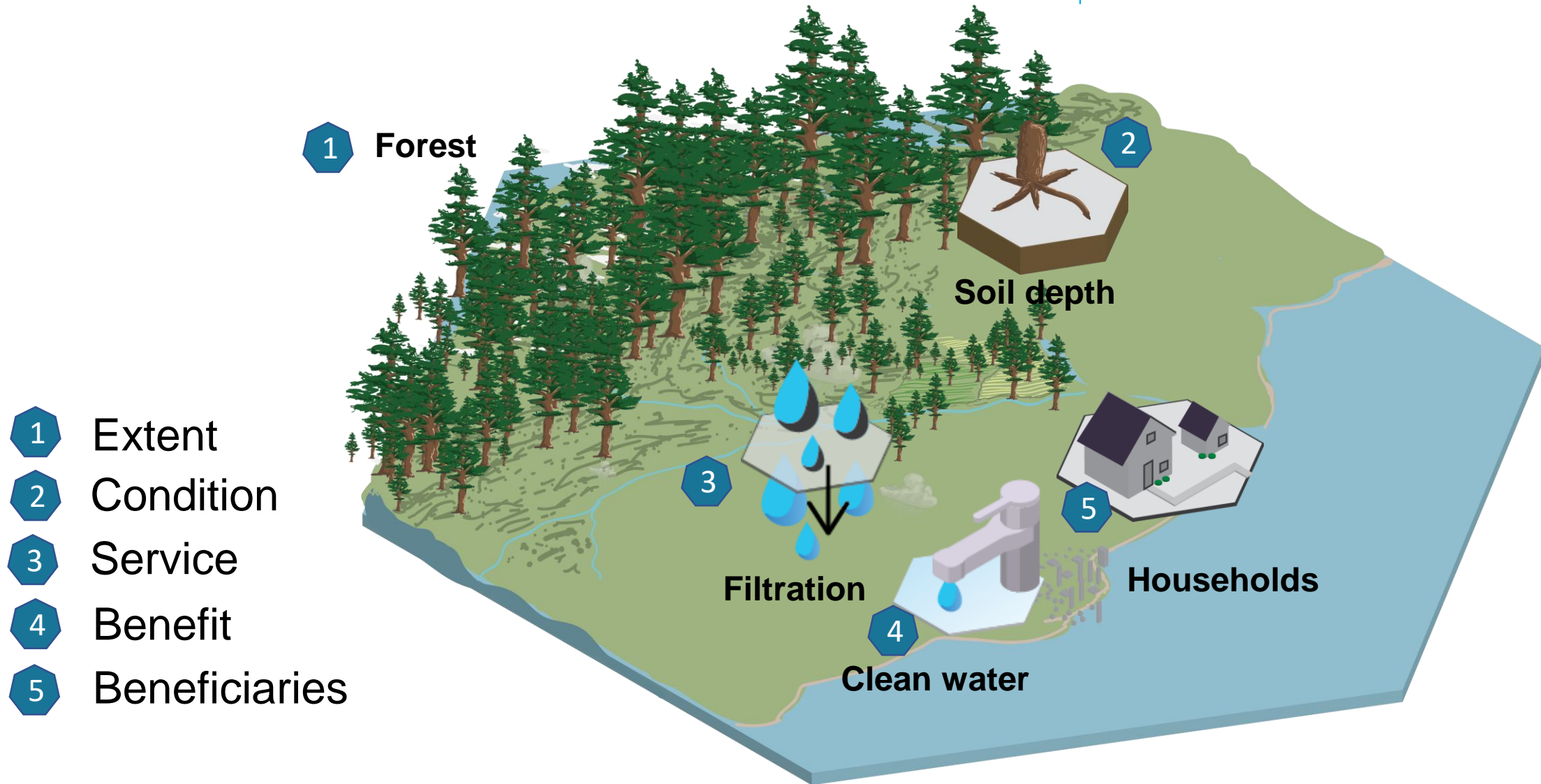


# SEEA EA - Types of Accounts





# SEEA EA Framework – Illustrative Example



# Ecosystem Services

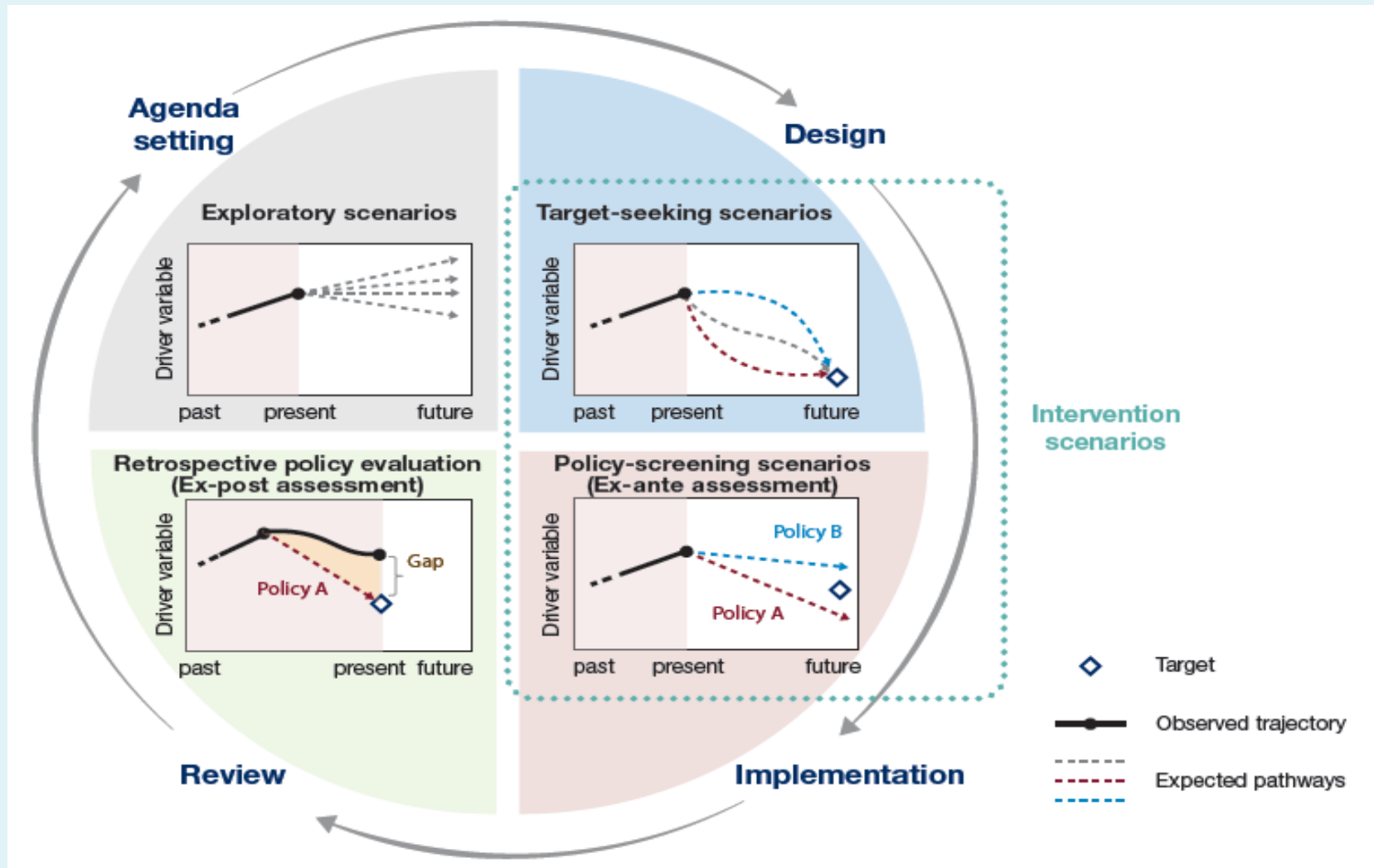


# Why Policy Scenario Analysis

- **Ecosystem accounts are** by nature **backward-looking**: they describe the state of affairs at some point in the past, which may be relevant for a whole range of policies.
- **Policymaking** is, by contrast, **forward-looking**: it seeks to influence future states of affairs based on decisions taken today.
- **The use of backward-looking data in forward-looking policy scenario analysis** that allows policymakers to assess the possible impacts of their choices.
- Policy Scenario analysis serves the **ultimate goal to improve decision making** in policy areas with many variables involved, by facilitating the comparison of alternative policy interventions.



# Categories of Policy Scenario Analysis



# The SEEA EA and Policy Scenario Analysis



NEW AND  
STANDARDIZED  
DATA INPUTS



IMPROVED EQUATIONS  
(UNDERSTANDING OF  
DYNAMICS)



NEW  
INDICATORS



SPATIAL  
DISAGGREGATION/  
INTERPRETATION

- **Transparency**
- **Replicability**
- **Credibility**
- **Legitimacy**
- **Reliability**

# South Africa and Natural Capital Accounts

- A world leader, instrumental in the international adoption of the SEEA EA
- 10-year NCA Strategy
- Established Governance structure: Natural Capital Accounting Forum; Community of Practice; Strategic Advisory Group
- In recent years:
  - *Land and Terrestrial Ecosystem Accounts*
  - *Protected Area Accounts*
  - *Strategic Water Source Areas*
  - *River Terrestrial Ecosystem Accounts*
  - *Metropolitan Area Accounts*
  - *Species Accounts for Rhinos and cycads*
  - ***Ecosystem service accounts for KwaZulu-Natal***
- Leading actor in the African NCA Community of Practice

# Pilot Ecosystem Services Accounts for KwaZulu-Natal

- Suite of eleven ecosystem services

*Table 1: Value of ecosystem service flows and associated asset values in 2005 and 2011; values in 2010 R millions. Note that the table shows both the global carbon values as well as national carbon values and the respective total flows and asset values associated with each.*

Class	Ecosystem service	2005		2011	
		Annual flow	Asset value	Annual flow	Asset value
		R millions	R millions	R millions	R millions
Provisioning	Wild resources	3 722.16	32 032.23	3 180.25	28 440.48
	Animal production	1 672.99	27 100.67	1 472.87	23 859.03
	Cultivation	6 456.70	104 591.91	7 535.43	122 066.22
Cultural	Nature-based tourism	532.83	8 631.31	798.83	12 940.22
	Property	1 164.97	18 871.27	1 327.78	21 508.60
Regulating	Carbon storage (global value)	29 922.56	484 745.42	34 579.34	560 185.33
	Pollination	51.26	830.33	47.69	772.50
	Flow regulation	3 247.87	52 612.12	3 166.78	51 298.55
	Flood attenuation	31.02	502.49	23.50	380.68
	Sediment retention	435.79	7 059.28	330.40	5 352.18
	Water quality amelioration	20.40	330.46	16.03	259.67
<b>Total</b>		<b>47 258.53</b>	<b>737 307.48</b>	<b>52 478.90</b>	<b>827 063.46</b>
<b>Value of flows and asset values in 2005 and 2011 when using national carbon values</b>					
Regulating	Carbon storage (national)	236.39	3 829.49	273.18	4 425.46
<b>Total</b>		<b>17 572.38</b>	<b>256 391.56</b>	<b>18 172.74</b>	<b>271 303.59</b>

## 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



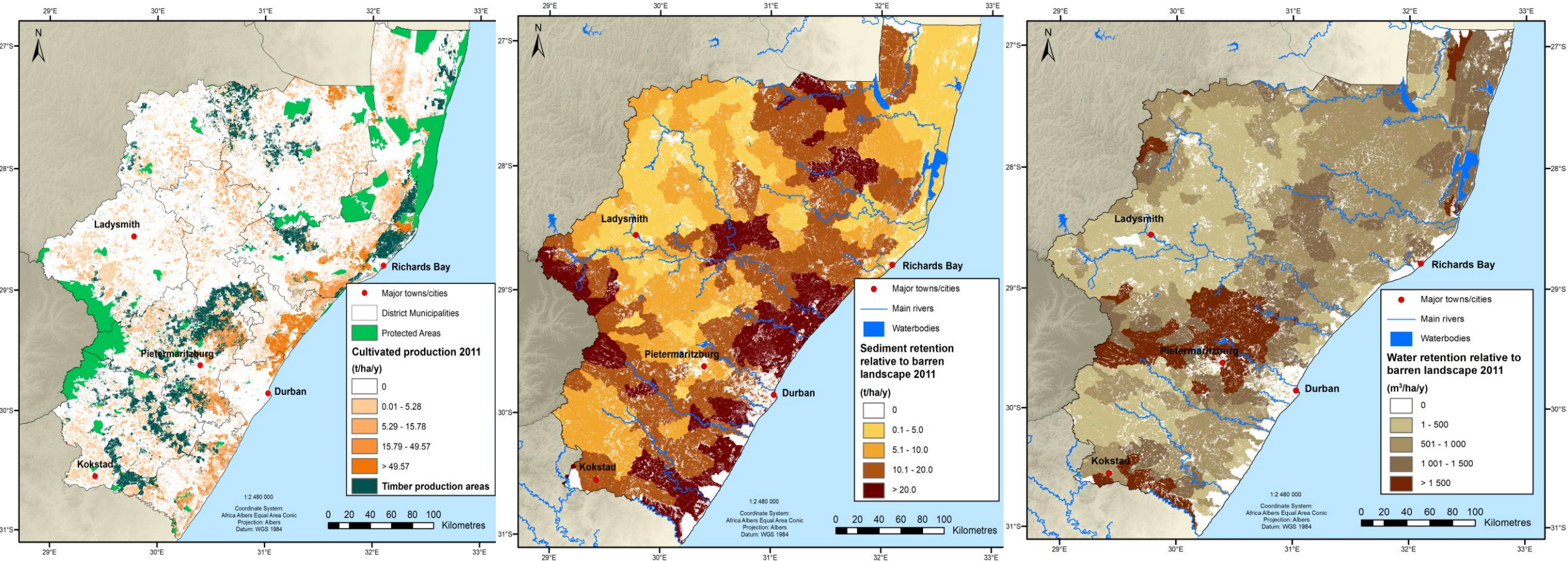
Turpie, J.K., Letley, G., Schmidt, K., Weiss, J., O'Farrell, P. and Jewitt, D.





# Ecosystem services accounts (biophysical) – KwaZulu-Natal

Spatially-explicit data on provision of ecosystem services – water retention, crop provisioning, and sediment retention shown here, but results for a suite of eleven ecosystem services

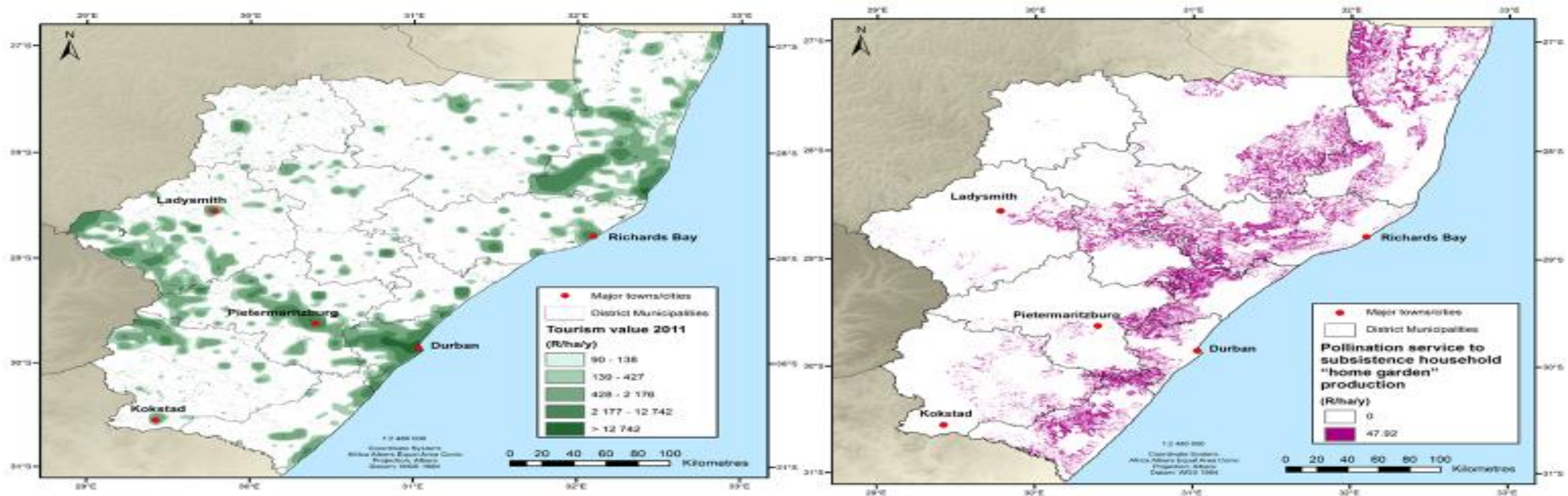




# Ecosystem services accounts (monetary) – KwaZulu-Natal South Africa

Spatially-explicit data on value of ecosystem services, and trends over time

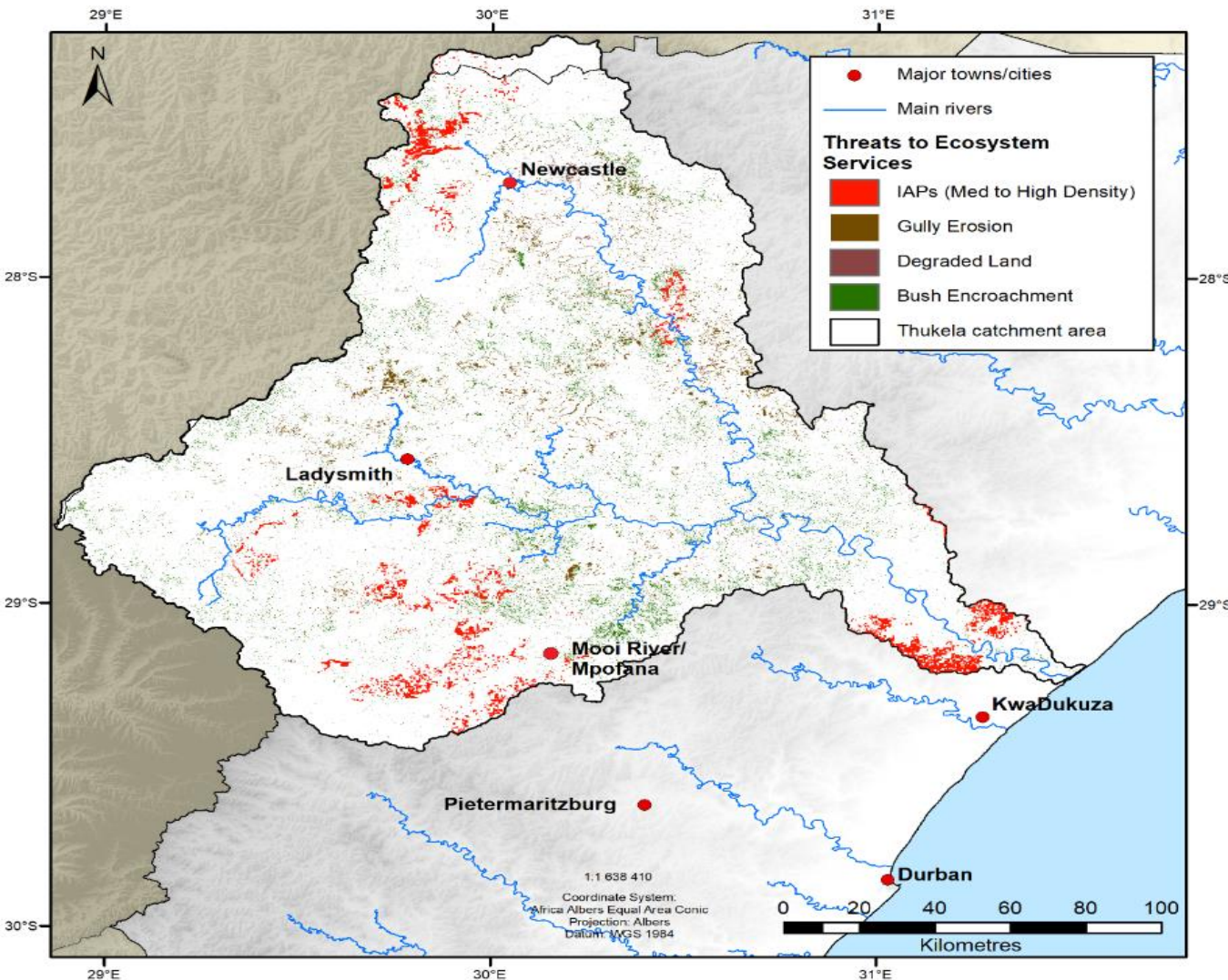
## *Selected results from ecosystem service: monetary valuation*





# Policy application: Ecosystem restoration in Thukela river basin

Cost-benefit analysis of ecosystem restoration programmes in Thukela river basin, KwaZulu-Natal



## Policies:

Extension services

Betterment schemes

Natural Resource Management Programmes

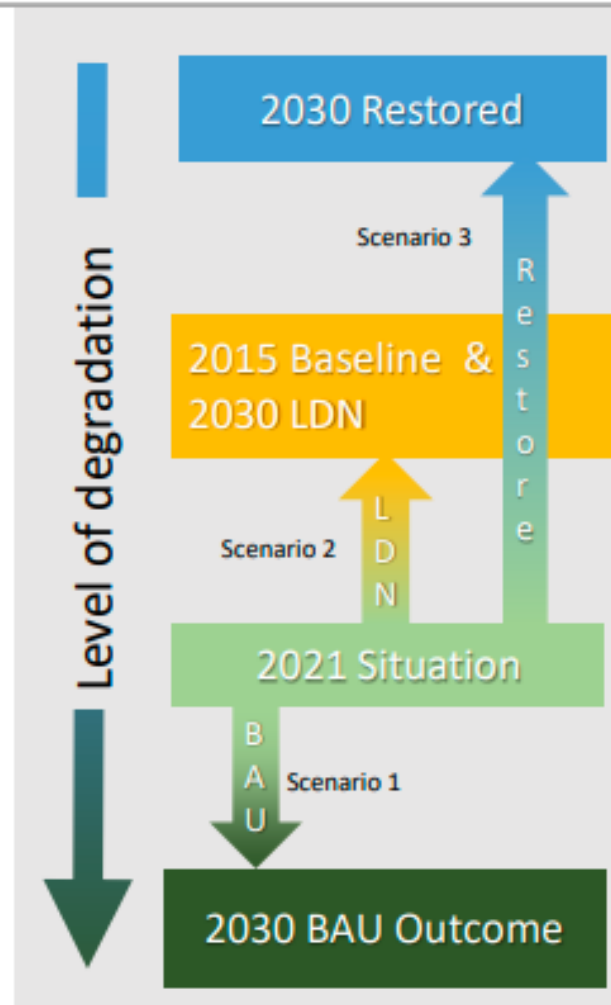
e.g. 'Working for Water'

2030 Land Degradation Neutrality target, UNCCD and SDGs

Source: Citation: Turpie, J.K., Letley, G., Schmidt, K., Weiss, J., O'Farrell and Jewitt, D. 2021. The potential costs and benefits of addressing land degradation in the Thukela catchment, KwaZulu-Natal, South Africa: NCAVES project report.

## Study approach

- Estimation of the baseline land cover, trajectory to 2030 under BAU and resulting land cover, and the restored land cover
- Modelling of ecosystem services under BAU, LDN and restored outcomes
  - Same methods as Pilot, including SWAT model
- Costs and benefits of interventions compared with BAU Scenario
  - Costs of interventions based on literature, previous studies
  - Benefits estimated as difference in value of ecosystem services compared to BAU outcome





# Policy application: Ecosystem restoration in Thukela river basin

Cost-benefit analysis of ecosystem restoration programmes in Thukela river basin, KwaZulu Natal

	Present value (R millions)		
	LDN Scenario		Full Restoration Scenario
	Upper bound costs	Lower bound costs	
<b>Costs relative to BAU</b>			
Clearing IAPs	514.4	514.4	2 355.2
Addressing Bush Encroachment	507.2	237.6	691.1
Active restoration of grasslands, erosion	2 623.6	–	–
Sustainable land management	–	1 981.02	6 093.62
<b>Total present value of costs</b>	<b>3 645.18</b>	<b>2 733.09</b>	<b>9 139.98</b>
<b>Benefits relative to BAU</b>			
Water supply	2 591.4	2 591.4	10 757.2
Sediment retention	38.9	38.9	63.1
Tourism	121.8	121.8	243.6
Carbon storage (avoided national cost)	–274.91	–274.91	597.5
Harvested resources	70.6	70.6	2 391.3
Livestock production	620.7	620.7	1 476.9
<b>Total present value of benefits</b>	<b>3 168.6</b>	<b>3 168.6</b>	<b>15 529.6</b>
<b>Net Present Value</b>	<b>–476.6</b>	<b>435.5</b>	<b>6 389.6</b>
<b>BCR</b>	<b>0.9</b>	<b>1.2</b>	<b>1.7</b>

Likely a vast underestimate because many intangible benefits cannot be valued. Other studies estimate a ROI of 9 – 30 for restoration projects.



Source: Citation: Turpie, J.K., Letley, G., Schmidt, K., Weiss, J., O'Farrell and Jewitt, D. 2021. The potential costs and benefits of addressing land degradation in the Thukela catchment, KwaZulu-Natal, South Africa: NCAVES project report.

## Policy application: Ecosystem restoration in Thukela river basin

- Halting and reversing ecosystem degradation has positive net economic benefits
- Preventing degradation now is more cost effective than fixing it later
- While ecosystem restoration can be expensive, requiring significant and sustained investments in order to be effective, the potential benefits are much higher than the costs
- Different restoration interventions have different impacts, some yielding more benefit than others
- Including other economic benefits in the analysis, such as employment, would further strengthen the case for restoration and sustainable land management
- For each Rand invested in full restoration there is a return of at least 1.7 Rand – conservative estimate
- Investment in restoration needs to be maintained through sustainable land management

# Further Reading

<https://seea.un.org/ecosystem-accounting/policy-scenario-analysis>

<https://seea.un.org/content/policy-scenario-analysis-using-seea-ecosystem-accounting>

<https://seea.un.org/content/towards-method-accounting-ecosystem-services-and-asset-value-pilot-accounts-kwazulu-natal>

<https://seea.un.org/content/potential-costs-and-benefits-addressing-land-degradation-thukela-catchment-kwazulu-natal>

## Towards a method for accounting for ecosystem services and asset value: Pilot accounts for KwaZulu-Natal South Africa, 2005-2011

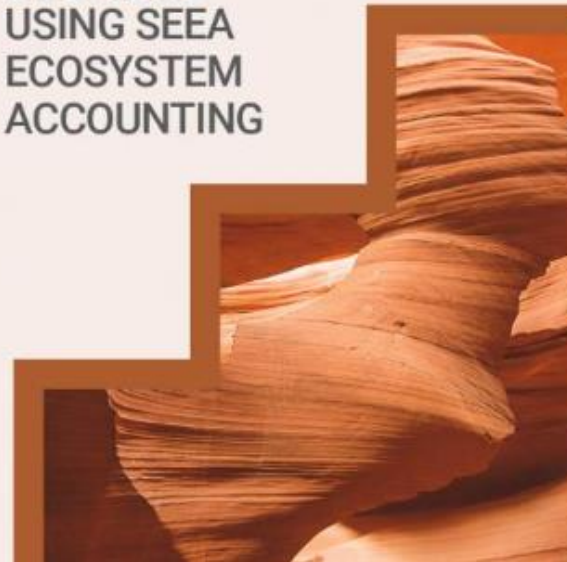
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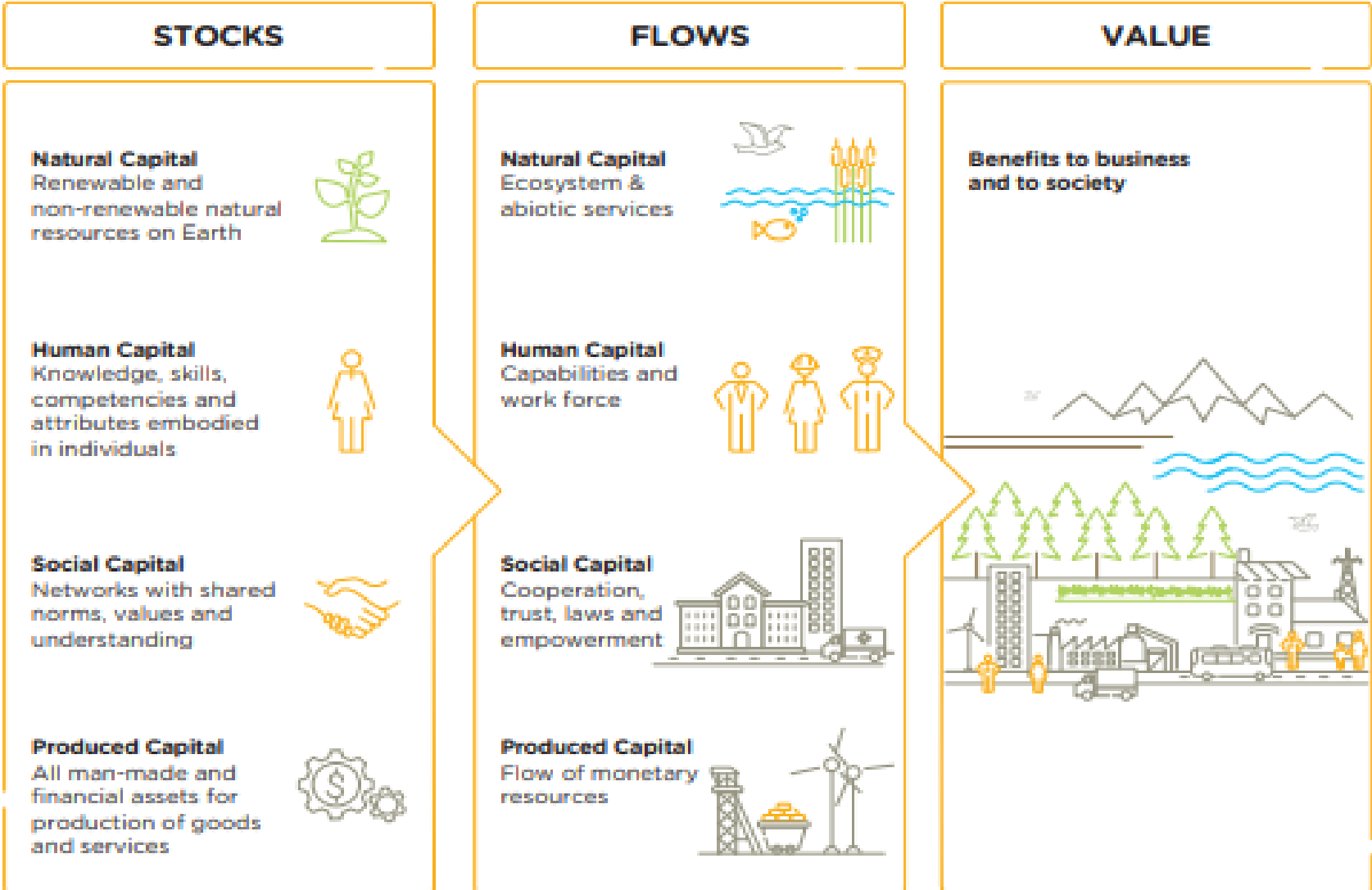
## POLICY SCENARIO ANALYSIS USING SEEA ECOSYSTEM ACCOUNTING



## The potential costs and benefits of addressing land degradation in the Thukela catchment, KwaZulu-Natal South Africa Report of the NCAVES Project



# Broadening the perspective beyond natural capital





## Proposed Work Package 1 Activities

- **Review of existing restoration prioritization.** Systematic review of past and present exercises for spatial prioritization of restoration in South Africa, development of criteria list for prioritization of sites and interventions
- **Development of accounts.** Development of ecosystem service accounts in physical and monetary terms consistent with the SEEA EA framework for selected provinces in which project restoration sites are located
- **Application to restoration policy.** Quantification of return on investment, social, economic and ecological costs and benefits of alternative policy scenarios for ecosystem restoration in the selected project intervention sites, applying biophysical modelling and valuation of ecosystem services (using market and non-market techniques)

## Proposed ReLISA Activities (evolving...)

- **Capacity development.** Capacity development on coding and modelling for ecosystem account compilation within national and provincial authorities to use geospatial and artificial intelligence based platforms such as ARIES for SEEA for biodiversity conservation and ecosystem restoration planning
- **Recommendations for data and modelling enhancement.** Develop recommendations for taking ecosystem accounting forward in South Africa, including recommendations of field (in situ) data that should be collected to support calibration, validation and refinement of ecosystem service models, developing an information hub for collaboratively improved ecosystem service modelling in South African ecosystems
- **Dissemination and knowledge management.** WP 7

## Some discussion points

- Using accounts generated at the Provincial level to inform decisions on restoration of the biomes
- Sequencing the development of accounts and their application to the project sites
- ...

Thank you for listening.



Questions and Discussion

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