System of Environmental Economic Accounting

UNITED NATIONS SIAP Statistical Institute for Asia and the Pacific

Brief Overview of SEEA Ecosystem Accounting and Policy Applications

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June 2023 – Based on presentation from Julian Chow (UNSD)

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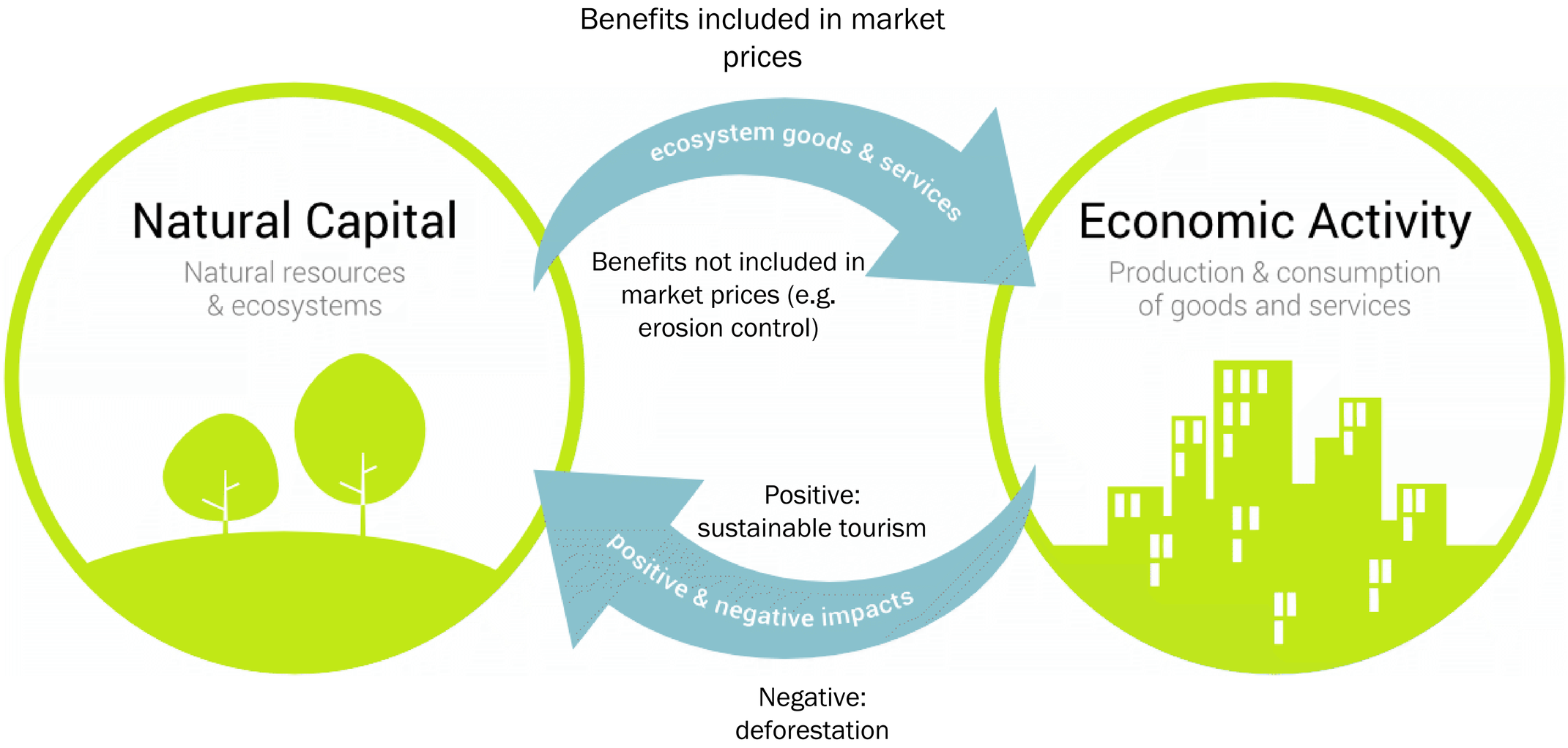
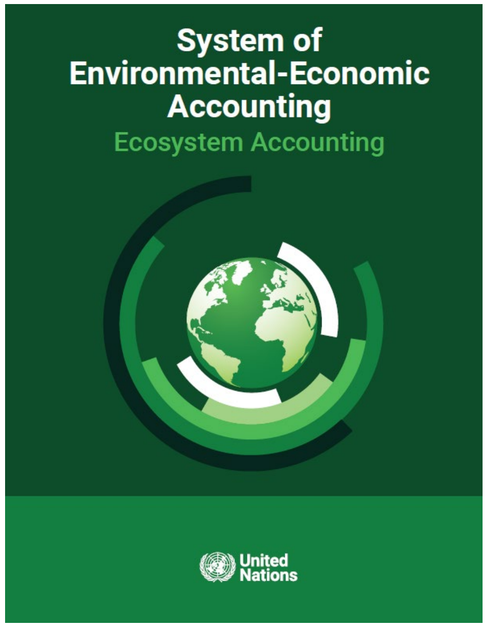
Economic activities depend on interaction with natural capital



SEEA: a standard to measure and value nature



- Brings together environmental and economic data using the same accounting principles of the SNA
- Credibility, reliability, replicability of data
- Consistency over time and space
- Common language between different communities
- Breaks down silos and fosters collaboration

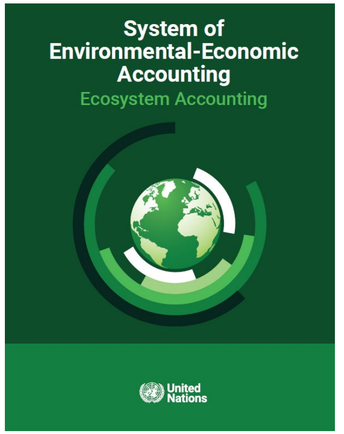
One Environment: Two Perspectives

CENTRAL FRAMEWORK
Assets

Timber

Water

Fish



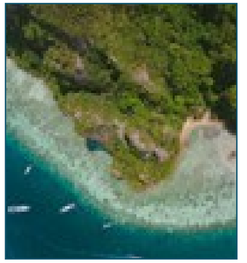
ECOSYSTEM ACCOUNTING
Services

Forests

e.g. flood control

Rivers

e.g. water purification



Coasts

e.g. recreation

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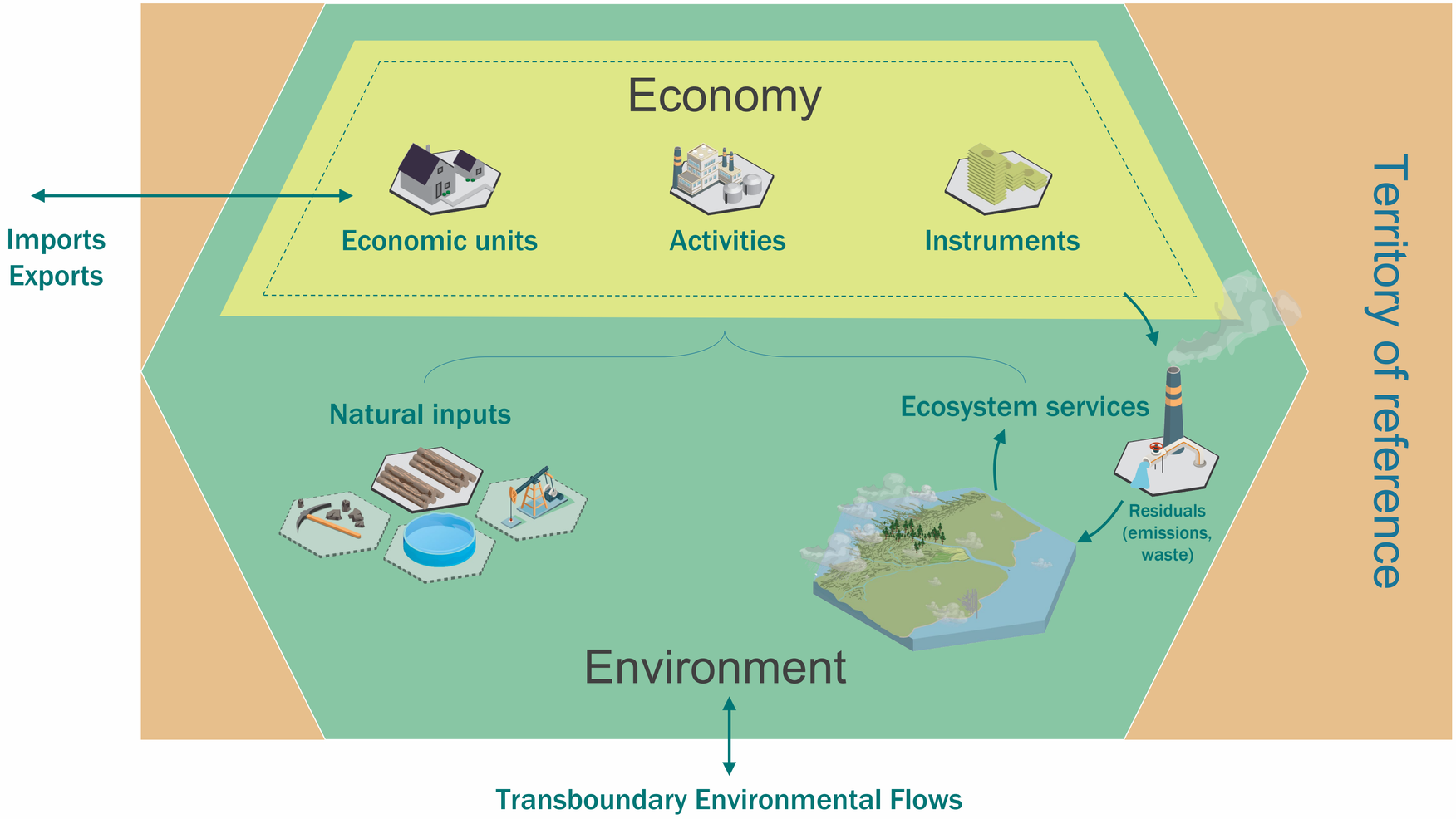
SEEA Conceptual Framework



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Economic
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SEEA Ecosystem Accounting

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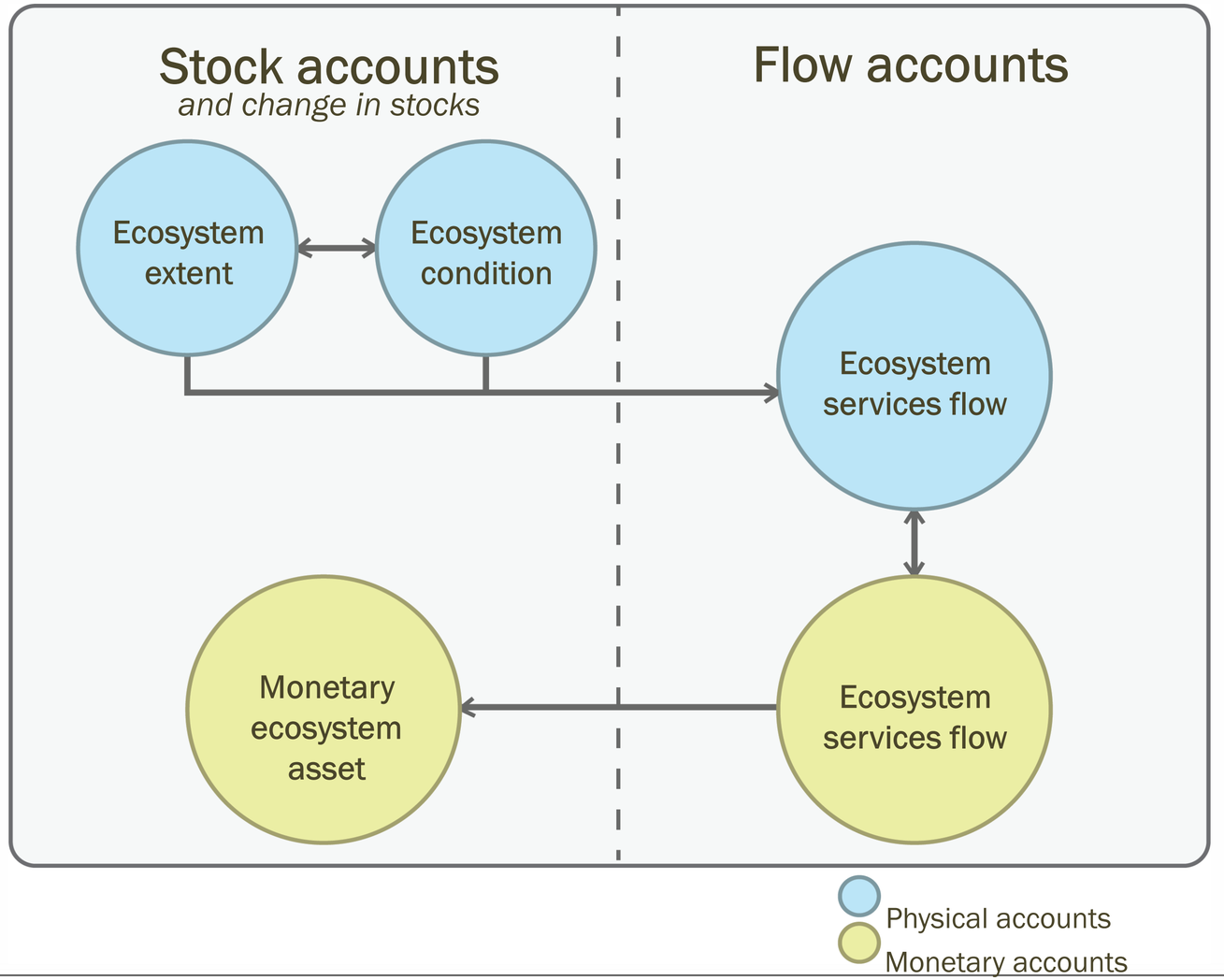
SEEA Ecosystem Accounting - Core Accounts



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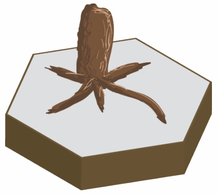
SEEA EA Framework – Illustrative Example

1 Asset – **forest**

2 **Condition**



Soil depth

3 **Services**

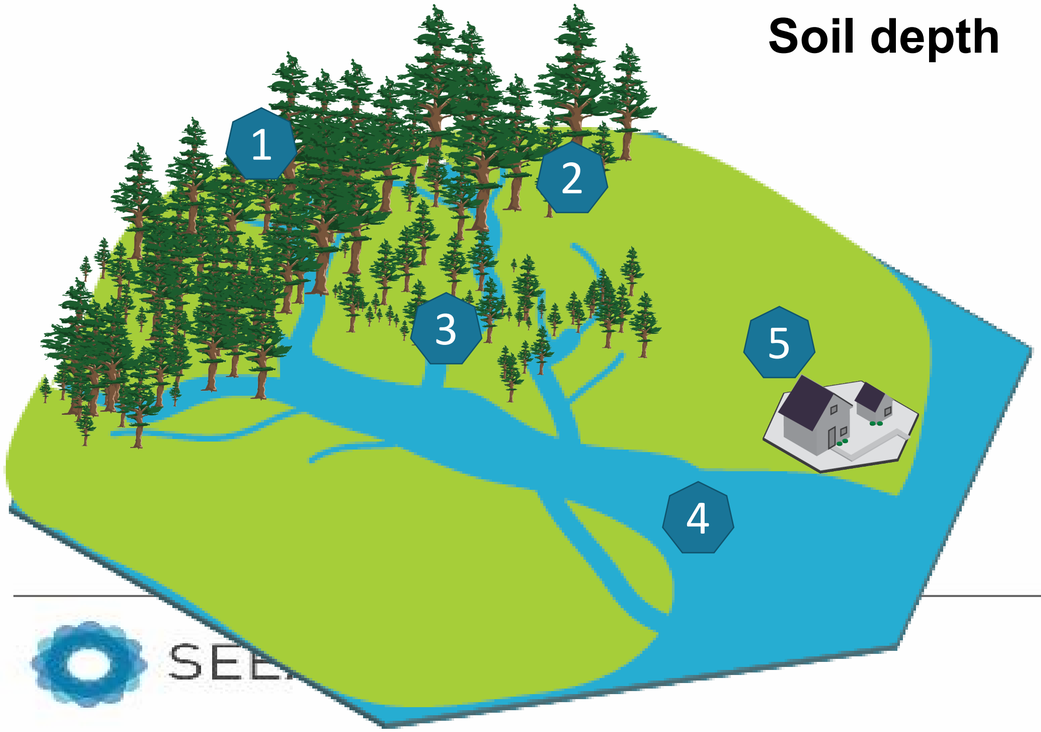
Water filtration

4 **Benefits**

Clean water

5 **Beneficiaries**

People



SEEA Ecosystem Accounting

- One integrated document, remove “Experimental”
- Chapters 1-7 on accounting framework and physical accounts adopted as an international statistical standard
- Chapters 8-11 on valuation
- Chapters 12-14 on applications and extensions
- Related guidelines
  - SEEA EA Implementation Strategy
  - Guidelines for biophysical modelling, valuation, scenario analysis
  - Implementation guidelines and technical notes
  - ARIES for SEEA (https://seea.un.org/content/aries-for-seea)

Section: A
Introduction and overview

- Ch.1: Introduction
- Ch.2: Principles of ecosystem accounting

Section B
Accounting for ecosystem extent and condition

- Ch.3: Spatial units for ecosystem accounting
- Ch.4: Accounting for ecosystem extent
- Ch.5. Accounting for ecosystem condition

Section C: Accounting for ecosystem services

- Ch.6. Ecosystem services concepts for accounting
- Ch.7. Accounting for ecosystem services in physical terms

Section D: Monetary valuation and integrated accounting of ecosystem services and assets

- Ch. 8 Principles of monetary valuation for ecosystem accounting
- Ch. 9 Accounting for ecosystem services in monetary terms
- Ch. 10 Accounting for ecosystem assets in monetary terms
- Ch. 11. Integrated and extended accounting for ecosystem services an assets

Section E: Complementary valuations, thematic accounting and indicators

- Ch.12: Complementary approaches to valuation
- Ch.13: Accounting for specific environmental themes
- Ch.14: Indicators and combined presentations

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Policy applications

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Why SEEA?

- **Makes nature count** within economic planning and decision-making
- **Standardization is important** in order to obtain high-quality, and comparable statistics
- **SEEA catalyzes collaboration** due its multi-disciplinary nature between different stakeholders--statistical office and universities, line ministries, businesses, etc
- **Provides framework for deriving indicators** to support various monitoring and reporting frameworks such as post-2020 GBF, SDGs, climate change, green economy

SEEA EA and SDGs

- SDG 15.1.1: Forest area as a proportion of total land area
- SDG 15.3.1: Proportion of land that is degraded over total land area

- SDG 6.6.1: Change in the extent of water related ecosystems over time

- SDG 11.7.1: Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities

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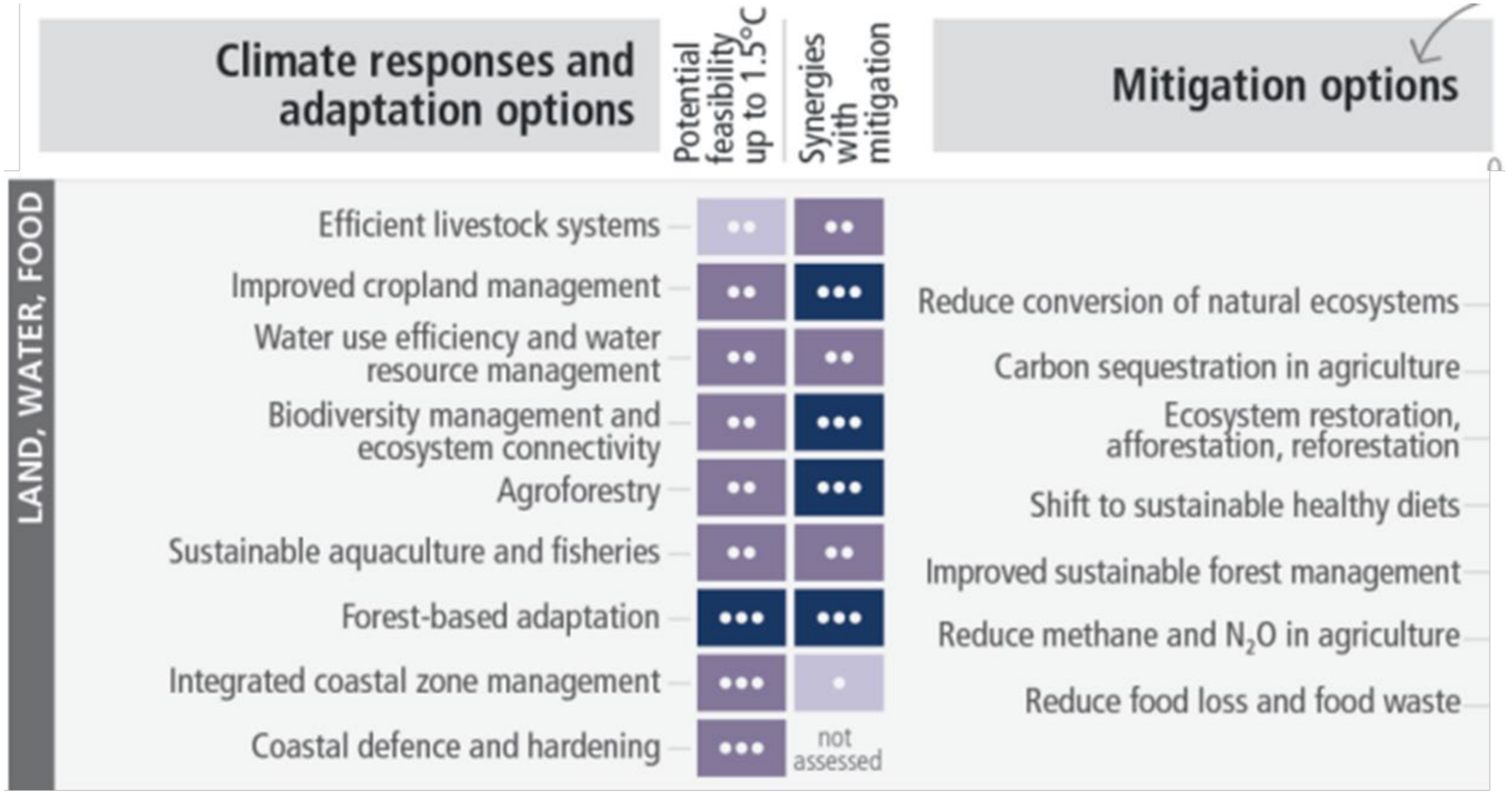
https://seea.un.org/sites/seea.un.org/files/documents/Indicators/3._using_the_seea_ea_for_calculating_selected_sdg_indicators.pdf

SEEA EA and Climate Change

Nationally determined contributions as part of the Paris Agreement contain targets and goals that are informed by SEEA EA accounts

- Carbon stock accounts
- Extent account
- Condition account
- Services account

SEEA EA and Climate Change



Synthesis Report (SYR) of the IPCC Sixth Assessment Report (AR6) (March 2023)

SEEA EA and the Kunming-Montreal Global Biodiversity Framework

The Conference of the Parties:

4. Notes the value of ***aligning national monitoring with the System of Environmental Economic Accounting statistical standard*** *in order to mainstream biodiversity in national statistical systems and to strengthen national monitoring systems and reporting as appropriate and according to their national priorities and circumstances*

DECISION ADOPTED BY THE CONFERENCE OF THE PARTIES TO THE CONVENTION ON BIOLOGICAL DIVERSITY
15/5. Monitoring framework for the Kunming-Montreal Global Biodiversity Framework

SEEA EA and the Kunming-Montreal Global Biodiversity Framework

- Nations adopt 4 goals, 23 Targets for 2030 in Landmark UN Biodiversity Agreement on 19 December 2022 https://prod.drupal.www.infra.cbd.int/sites/default/files/2022-12/221219-PressRelease-Final.pdf
- Headline and component indicators where SEEA serves as the methodological basis
  - Goal A: Extent of natural ecosystems (Headline)
  - Goal B: Services provided by ecosystems (Headline)
  - Target 1: Extent of natural ecosystems (Headline)
  - Target 9: Benefits from the sustainable use of wild species (Headline)
  - Target 11: Services provided by ecosystems (Headline)
  - Target 14: Integration of biodiversity into national accounting and reporting systems, defined as implementation of the System of Environmental-Economic Accounting (Component)
  - Target 19: Domestic public funding and private funding on conservation and sustainable use of biodiversity and ecosystems (Headline)

SEEA EA and the Kunming-Montreal Global Biodiversity Framework

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SEEA EA and the Kunming-Montreal Global Biodiversity Framework

- National biodiversity strategies and action plans (NBSAPs) to be revised an updated to align with the framework.
  - Opportunity to ensure that the updated NBSAPs take an integrated approach based on international statistical standards for reporting
  - Role of NSOs to ensure indicators in NBSAP are statistically sound
- National reports to be submitted in 2026 and 2029 that include the headline indictors

SEEA EA and National Policies—some examples

- Ecosystem accounts are a useful input to policy formulation and for measuring progress
  - E.g., EA data used in modeling exercises to inform regulation on climate change

- Direct government expenditures and services
  - E.g., Expenditures on protected areas <---> SEEA EA condition accounts
- Agency based policy instruments
  - E.g., Rules on level of emissions added to water that is returned to ecosystem assets <---> SEEA EA condition accounts
  - E.g., Permits to use services from a certain ecosystem assets <---> SEEA EA services accounts

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Policy scenario analysis using SEEA

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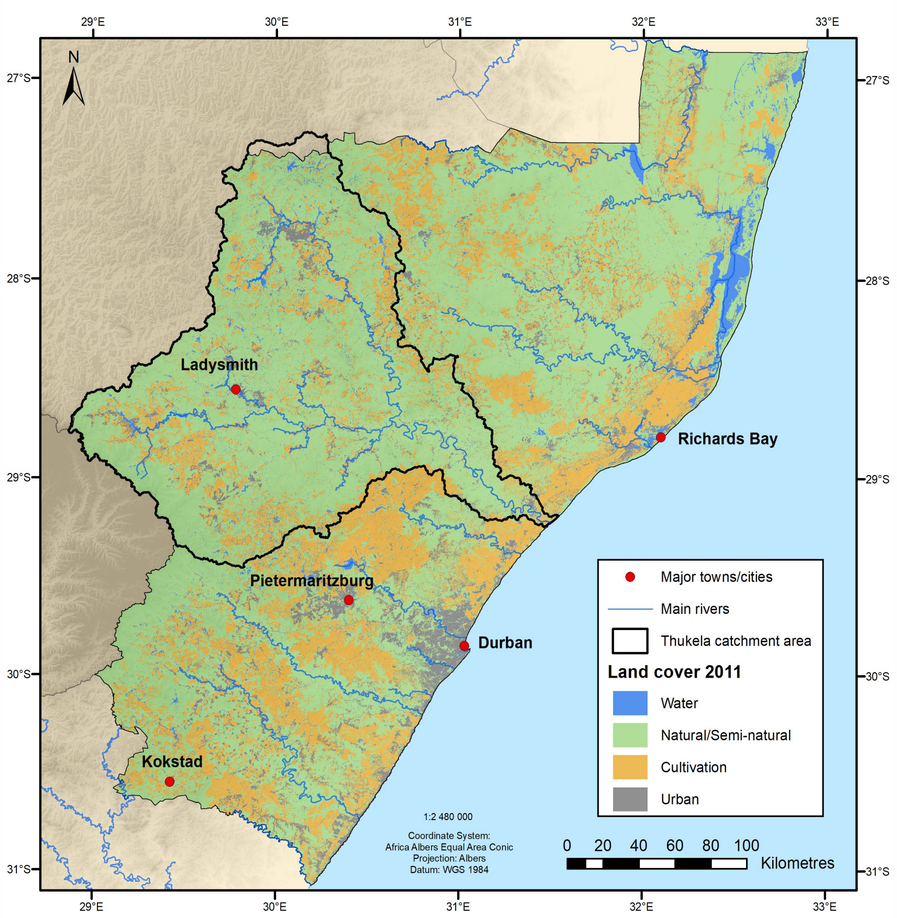
Restoration of Thukela River Catchment area in South Africa

- The Thukela River catchment occupies about a third of the province of KwaZulu-Natal. It provides a range of ecosystem services which contribute to the economy and to the provision of sustainable livelihoods.
- The national government aims to combat land degradation that affects grassland and savanna biomes, which dominate the landscape.
- Interventions such as removing invasive Eucalyptus will have direct costs but also yield benefits in terms of enhanced provision of ecosystem services.
- As these benefits are often hard to measure, the project used the SEEA EA and scenario analysis to determine which interventions are most cost effective.



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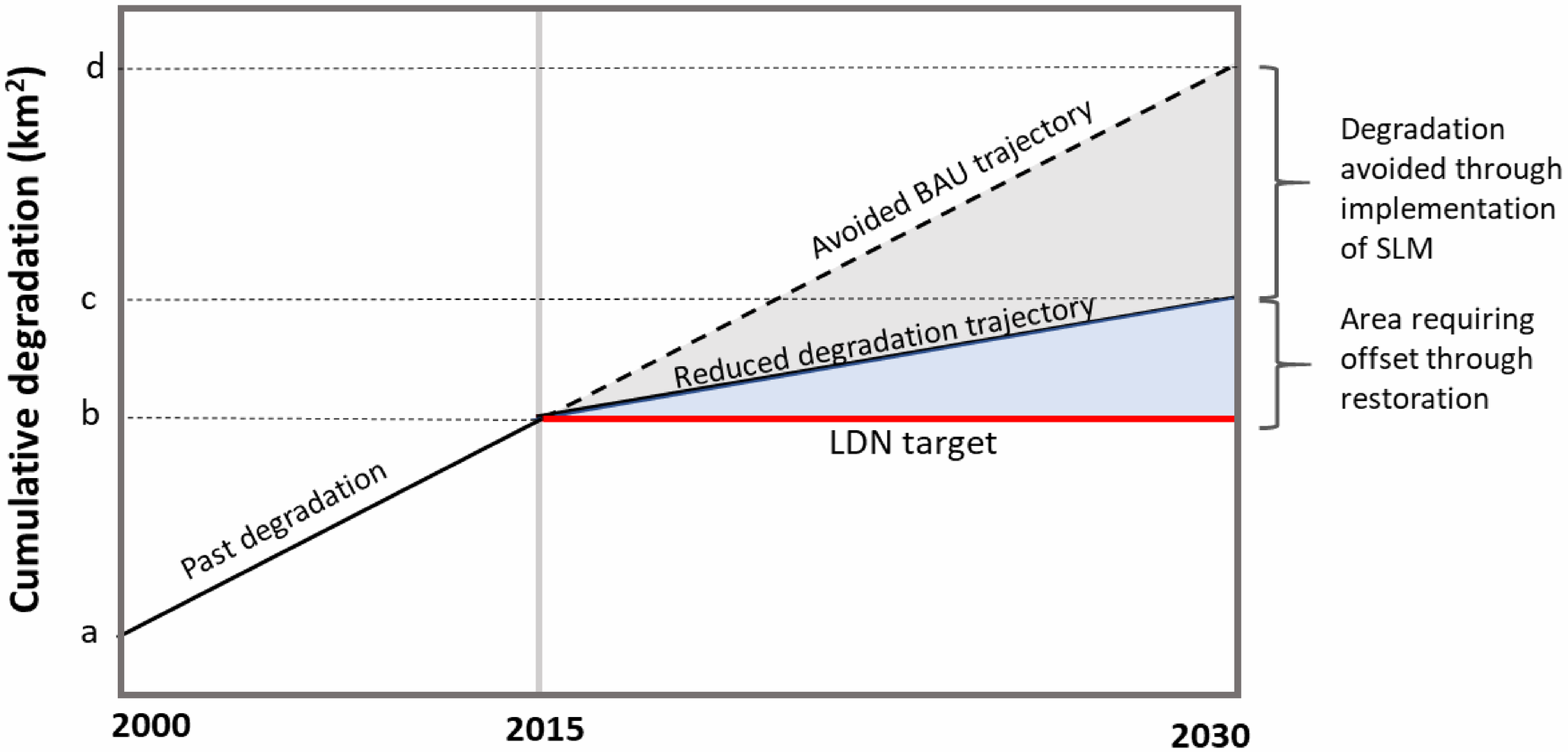
Aims

- Provide insights into the consequences of land degradation and the costs and benefits of investing in measures to address it.
- What will be the cost and return on investment (ROI) of achieving land degradation neutrality (relative to 2015) by 2030? and
- Is it enough to aim for LDN targets, or is further restoration justifiable?

Photo: Joshua Weiss

Conceptual and analytical framework



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SDG Degradation Reference Year

LDN Baseline year

LDN Target deadline

Study approach

The modelling included 7 ecosystem services:

Water retention (regulation of water supply)

Sediment retention (erosion control)

Carbon sequestration

Provisioning of livestock products

Provisioning of wood products

Provisioning of non-wood products

Nature-based tourism

Full Restoration scenario	Interventions will be implemented from 2021 to 2030, restoring all degraded areas as of 2021 to a healthy condition.
Land-Degradation Neutrality (LDN) scenario	Estimates what it costs to achieve LDN by 2030, in line with South Africa's international commitments. This requires restoration of the degradation that had already occurred from 2015-2021, followed by the implementation of sustainable land managing (SLM) measures. Lower and upper bound estimates of costs were based on assumptions about the efficiency of SLM in halting future degradation. The reality was expected to lie between these two estimates.
Business-As-Usual (BAU)	Land degradation will continue through bush encroachment, loss of vegetative cover, land erosion, and spread of IAPs. Levels of intervention will remain low.

- 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
- Benefits estimated as difference in value of ecosystem services compared to BAU outcome
- Costs of interventions based on literature, previous studies

Results and conclusions

Physical supply and monetary value of ecosystem per scenarios

	BAU	LDN Scenario	Full Restoration Scenario
Biophysical supply			
Yield increase (Mm^3 relative to BAU)		16	64
Sediment retained (t/ha/y)	10	10	10
Ecosystem carbon (Tg C)	357	354	363
Livestock production (LSU/y)	496 590	534 161	571 425
Wood products (m^3)	410 932	370 057	352 165
Non-wood products (t)	22 136	24 232	28 477
Nature-based tourism value (R million)	85	95	104
Value (R millions in 2030)			
Water supply (relative to BAU)		171	709
Erosion control	287	289	291
Carbon storage (global)	261 317	259 093	266 006
Carbon storage (national)	2 064	2 047	2 101
Livestock production	826	865	918
Wood products	689	616	584
Non-wood products	22	23	22
Nature-based tourism value	85	95	104

Cost benefit analysis

	Present value (R millions)		
LDN Pessimistic	**Best-case**	**Base estimate**	**Worst-case**
Total present value of costs	2 707.7	3 645.2	5 760.3
Total present value of benefits	4 166.9	3 168.6	- 547.0
Net Present Value	**1 459.2**	**- 476.6**	**- 6 307.3**
BCR	**1.5**	**0.9**	**- 0.1**
LDN Optimistic	**Best-case**	**Base estimate**	**Worst-case**
Total present value of costs	1 718.5	2 733.1	5 723.5
Total present value of benefits	4 166.9	3 168.6	- 547.0
Net Present Value	**2 448.4**	**435.5**	**- 6 270.5**
BCR	**2.4**	**1.2**	**- 0.1**
Full restoration			
Total present value of costs	4 788.7	9 140.0	25 812.2
Total present value of benefits	19 563.1	15 529.6	8 796.6
Net Present Value	**14 774.4**	**6 389.6**	**- 17 015.6**
BCR	**4.1**	**1.7**	**0.3**

- Halting and reversing ecosystem degradation has positive net economic benefits. Preventing degradation now is more cost effective than fixing it later. The sooner restoration begins, the better.
- 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. Restored areas need to be maintained; otherwise future costs will be incurred to restore again once land becomes degraded
- The application shows the usefulness of ecosystem accounting in policy making

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THANK YOU

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