

System of
Environmental
Economic
Accounting

Reflections from the perspective of the UN Technical Committee on SEEA Ecosystem Accounting

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Chair: Technical Committee on SEEA Ecosystem Accounting

International Workshop on Earth Observation for SEEA-Compliant Natural Capital Accounting

22-23 May 2024, Athens (and online)



United Nations

Overview

- Focus of the work programme of the Technical Committee
 - Including GBF headline indicators based on SEEA EA
- Key ingredients for implementing ecosystem accounting
- Three challenges/opportunities for integrating EO data into ecosystem accounting
 - Conceptual clarity on the relationship between land cover, land use and ecosystem types
 - In-situ data for training and validation
 - Guidance for compilers of accounts on using EO datasets and related models

Focus of the work programme of the Technical Committee

Key elements of 2024-25 work programme include:

- Developing **practical guidance for countries** on compiling ecosystem accounts
 - Focus is on foundations and core accounts
- Supporting the development of **GBF headline indicators** based on SEEA Ecosystem Accounting

→ These are related in practice

EO has not been a standalone topic of the TC's discussions but is highly relevant to these key elements

Kunming-Montreal Global Biodiversity Framework



adopted December 2022 at CBD COP15

FOUR GOALS

Goal A

Protect and Restore

Goal B

Prosper with Nature

Goal C

Share Benefits Equally

Goal D

Invest and Collaborate

23 TARGETS in three themes

Reducing threats to biodiversity
(Targets 1-8)

Meeting people's needs through sustainable use and benefit-sharing
(Targets 10-13)

Tools and solutions for implementation and mainstreaming
(Targets 14-23)

Monitoring framework with 19 headline indicators

Two of these 19 indicators used SEEA Ecosystem Accounting as their methodological basis and have UNSD as the custodian of the indicator

GBF Goal A: Protect and Restore

Three elements:

Headline indicators:

Ecosystems

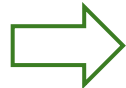
The integrity, connectivity and resilience of all **ecosystems** are maintained, enhanced, or restored, *substantially increasing the area of natural ecosystems by 2050*;



A.1 Red List of Ecosystems
A.2 Extent of natural ecosystems
(based on SEEA Ecosystem Accounting)

Species

Human induced extinction of known threatened **species** is halted, and, by 2050, the extinction rate and risk of all species are reduced tenfold and the abundance of native wild species is increased to healthy and resilient levels;



A.3 Red List Index for Species

Genetic diversity

The **genetic diversity** within populations of wild and domesticated species, is maintained, safeguarding their adaptive potential.



A.4 The proportion of populations within species with an effective population size > 500

GBF Goal B: Prosper with Nature

Biodiversity is sustainably used and managed and nature's contributions to people, including ecosystem functions and services, are valued, *maintained and enhanced, with those currently in decline being restored*, supporting the achievement of sustainable development for the benefit of present and future generations by 2050.

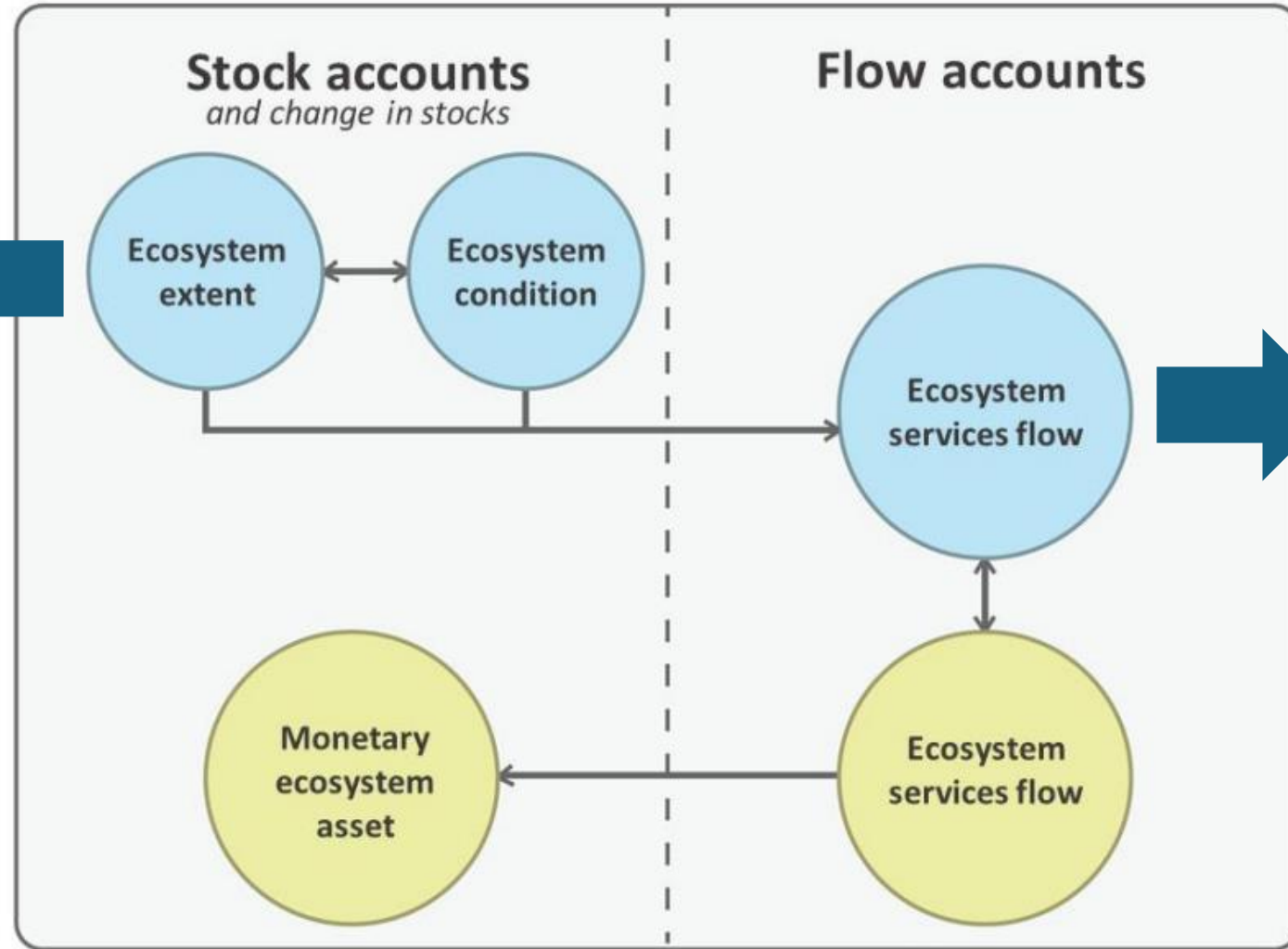
Headline indicator

B.1 Services provided by ecosystems

(based on SEEA Ecosystem Accounting)

Five core ecosystem accounts in SEEA

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**

Each indicator has a metadata document

- Available at <https://gbf-indicators.org/>
- Includes rationale, definition, concepts, method of computation

1. Indicator name

Extent of natural ecosystems

2. Date of metadata update

2024-03-28 12:00:00 UTC

3. Goals and Targets addressed

3a. Goal

Headline Indicator for **Goal A**: The integrity, connectivity and resilience of natural ecosystems are maintained and enhanced, substantially increasing the area of natural ecosystems by 2050; By 2050, the extinction rate and risk of all species are reduced tenfold; Ecosystems are resilient; The genetic diversity within populations of wild and domesticated species is maintained and enhanced.

1. Indicator name

Services provided by ecosystems

2. Date of metadata update

2024-03-28 12:00:00 UTC

3. Goals and Targets addressed

3a. Goal

Headline indicator for **Goal B**: Biodiversity is sustainably used and managed and nature's contributions to people, including ecosystem functions and services, are valued, maintained and enhanced, with those currently in decline being restored, supporting the achievement of sustainable development for the benefit of present and future generations by 2050.

Under the Technical Committee we set up a task team for each indicator, consisting of TC members, members of CBD Ad Hoc Technical Expert Group on monitoring framework and additional experts

Headline indicators will be reported as part of country's National Reports to the CBD

- First report early 2026
- Next one 2029
- Then every four years

Through CBD Online Reporting Tool

<https://ort.cbd.int/>

Templates for reporting on indicators will be provided for countries

Countries will have **three options** for reporting each headline indicator:

- Use national data
- Use global data
- Do not report the indicator (if national data not available and global data not suitable)

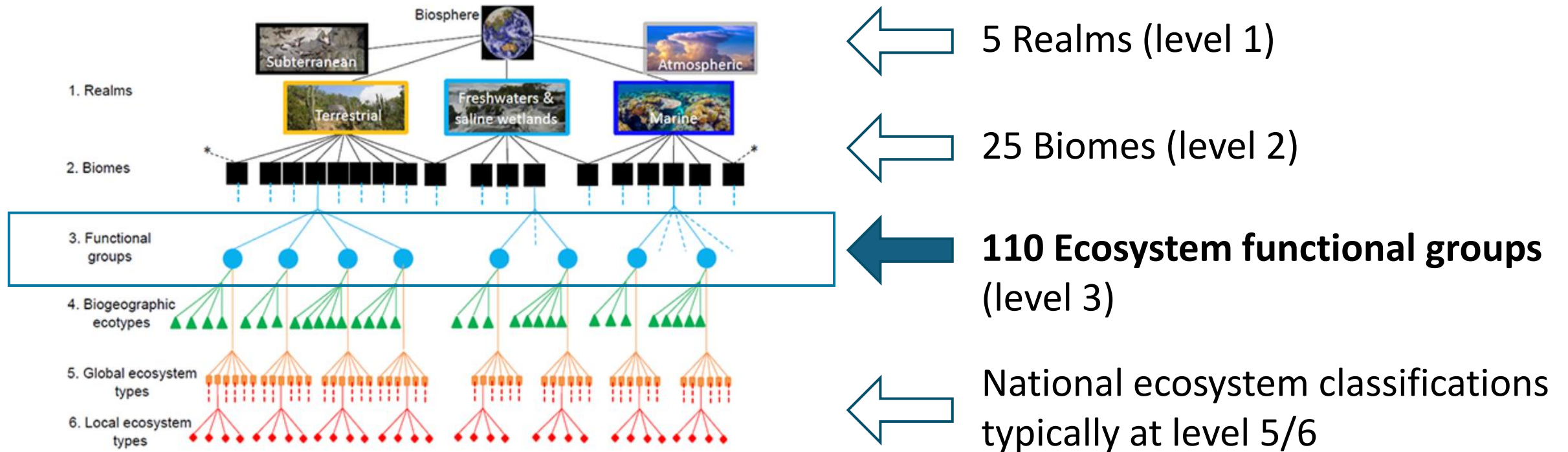
AHTEG recommended that ecosystem-related indicators should be disaggregated by ecosystem functional group (Level 3) in the Global Ecosystem Typology

Indicator definitions

- A.2 The extent of natural* ecosystems as a proportion of the total area of the country, at a particular point in time, expressed as a percentage
 - With various possible disaggregations
- B.1 The average rate of change in the provision of a set of ecosystem services in a particular time period, compared to a baseline year
 - Overall index
 - Sub-indices for provisioning, regulating and cultural services
 - Various other possible disaggregations

* “natural” defined broadly to include natural and semi-natural

The scope of natural ecosystems is defined based on level 3 of the Global Ecosystem Typology



Of the 110 ecosystem functional groups, 98 are natural and 12 are anthropogenic

Of the 110 ecosystem functional groups in the GET, **12 are anthropogenic**:



Realm	Biome	Ecosystem functional group
Terrestrial	T7 Intensive land-use systems ⁶	T7.1 Annual croplands
		T7.2 Sown pastures and fields
		T7.3 Plantations
		T7.4 Urban and industrial ecosystems
Freshwater	F3 Artificial fresh waters	F3.1 Large reservoirs
		F3.2 Constructed lacustrine wetlands
		F3.3 Rice paddies
		F3.4 Freshwater aquafarms
		F3.5 Canals, ditches and drains
Marine	M4 Anthropogenic marine systems	M4.1 Submerged artificial structures
		M4.2 Marine aquafarms
Marine-terrestrial	MT3 Anthropogenic shorelines	MT 3.1 Artificial shorelines

Anthropogenic or intensively modified ecosystems are *predominantly* influenced by human activities → determines ecosystem properties

In contrast: **Natural ecosystems** (not shown here) are ecosystems in which the impacts of humans on ecosystem composition, structure and function are low compared to natural factors

Mock-up of Indicator A.2: Extent of natural ecosystems

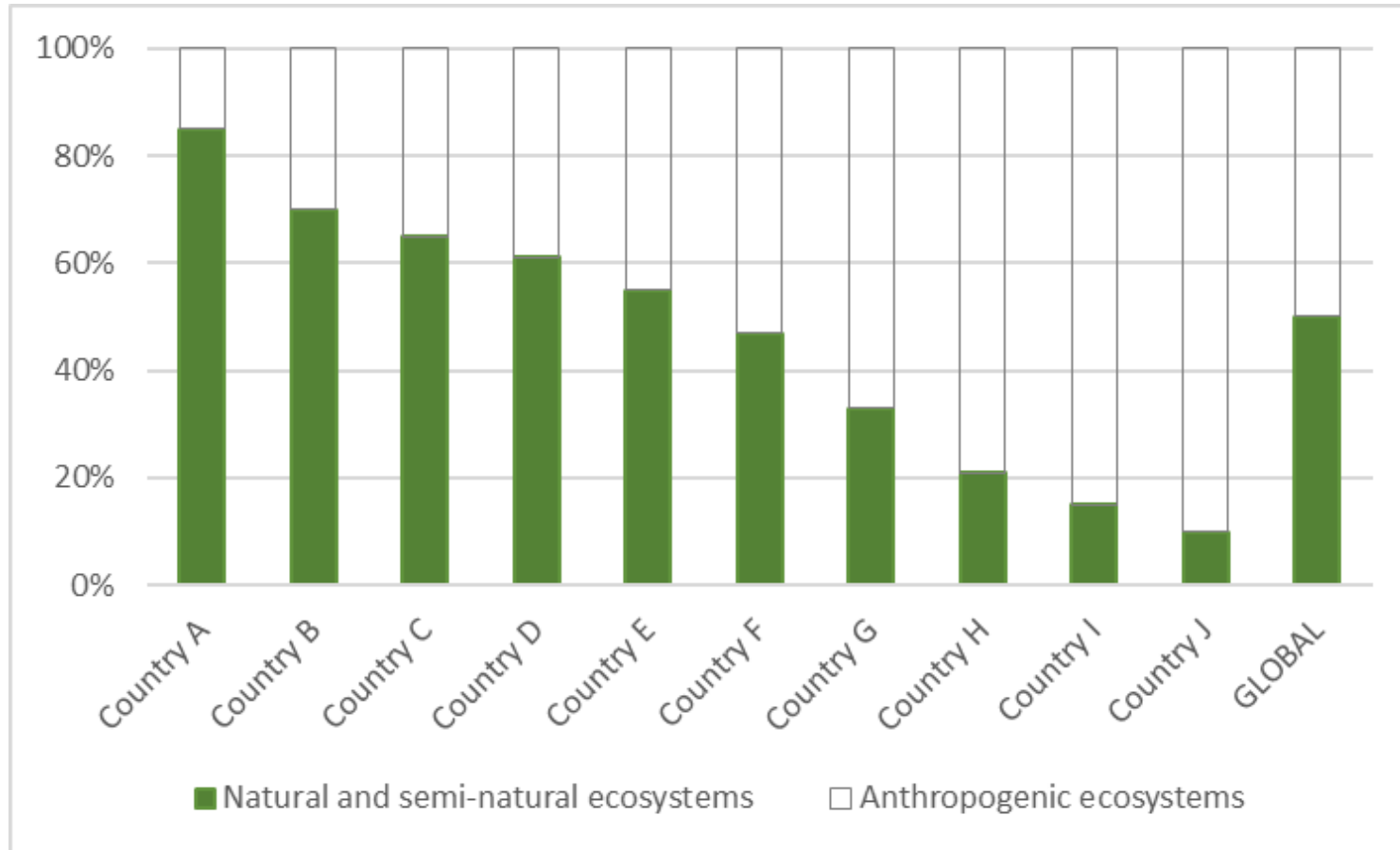


Figure 1. Proportion of natural ecosystems as at [end of accounting period]

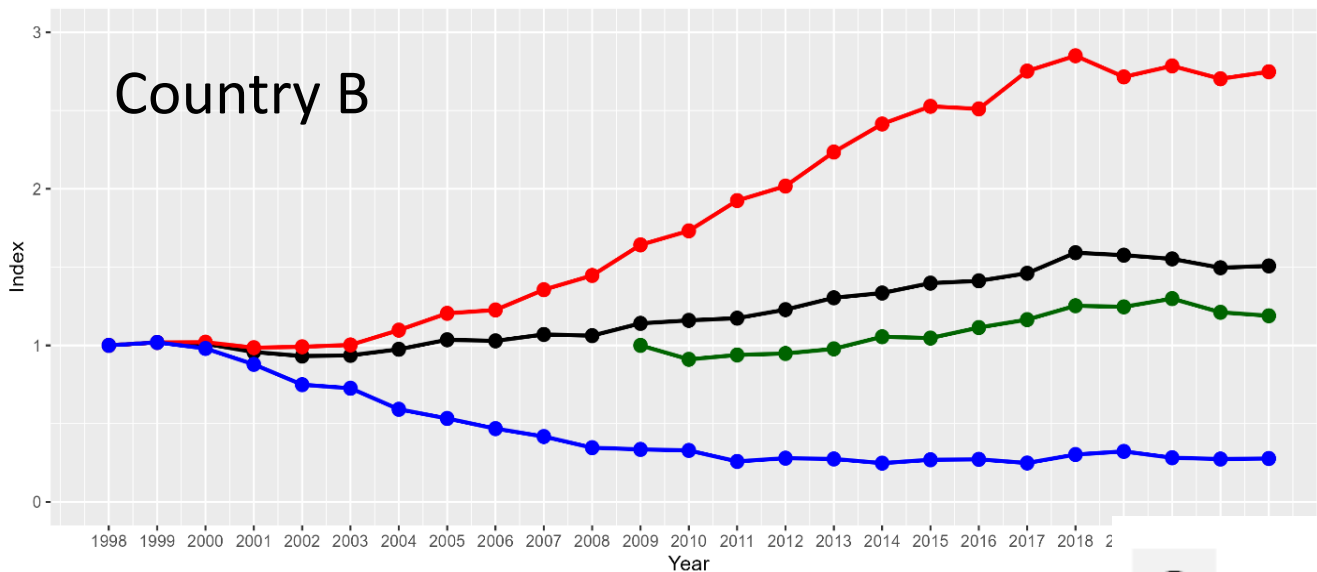
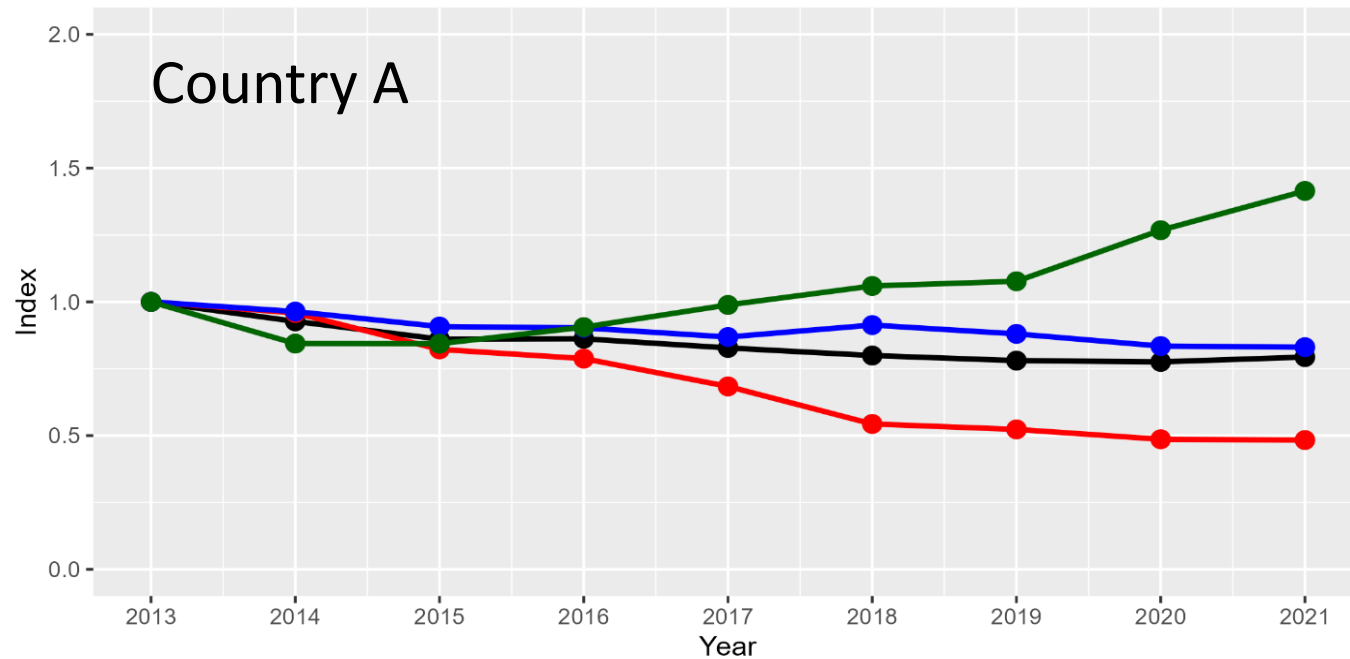
- Easy to understand snapshot of the relative area of natural ecosystems at national and global level
- Can be shown for all natural ecosystems combined, OR disaggregated by realm, biome, EFG (or more detail at national level)
- Trends evident from changes in the proportion over time

Indicator A.2 methodology

Steps

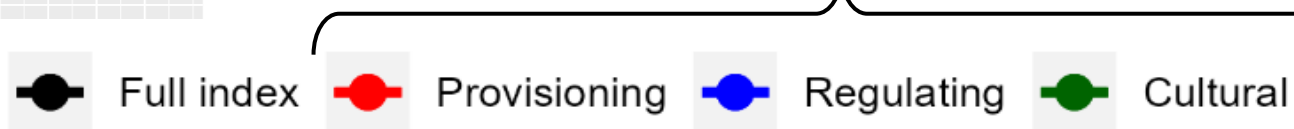
- Compile ecosystem extent account using national ecosystem classification
- Cross-walk to ecosystem functional groups (level 3) in the Global Ecosystem Typology
- Calculate indicator by summing the area of natural ecosystems and dividing by total area of the country, expressed as a percentage
- Report indicator, but also the absolute extent (ha/km²) per EFG, allowing for global aggregation based on the absolute values

Some testing results for Indicator B.1 based on existing national ecosystem services accounts



Shows trend in provision of ecosystem services relative to a base year represented by the value 1

Three sub-indices



Indicator B.1 methodology

Steps

- Select ecosystem services to be included in the indicator
 - Blended approach, including global and national priorities
- Compile accounts for those services
- Calculate the indicator (index and sub-indices) based on information from the accounts
- Report indicator, but also the absolute values for each ecosystem service to allow flexibility in global aggregation

Practical guidance for countries currently being developed by the TC

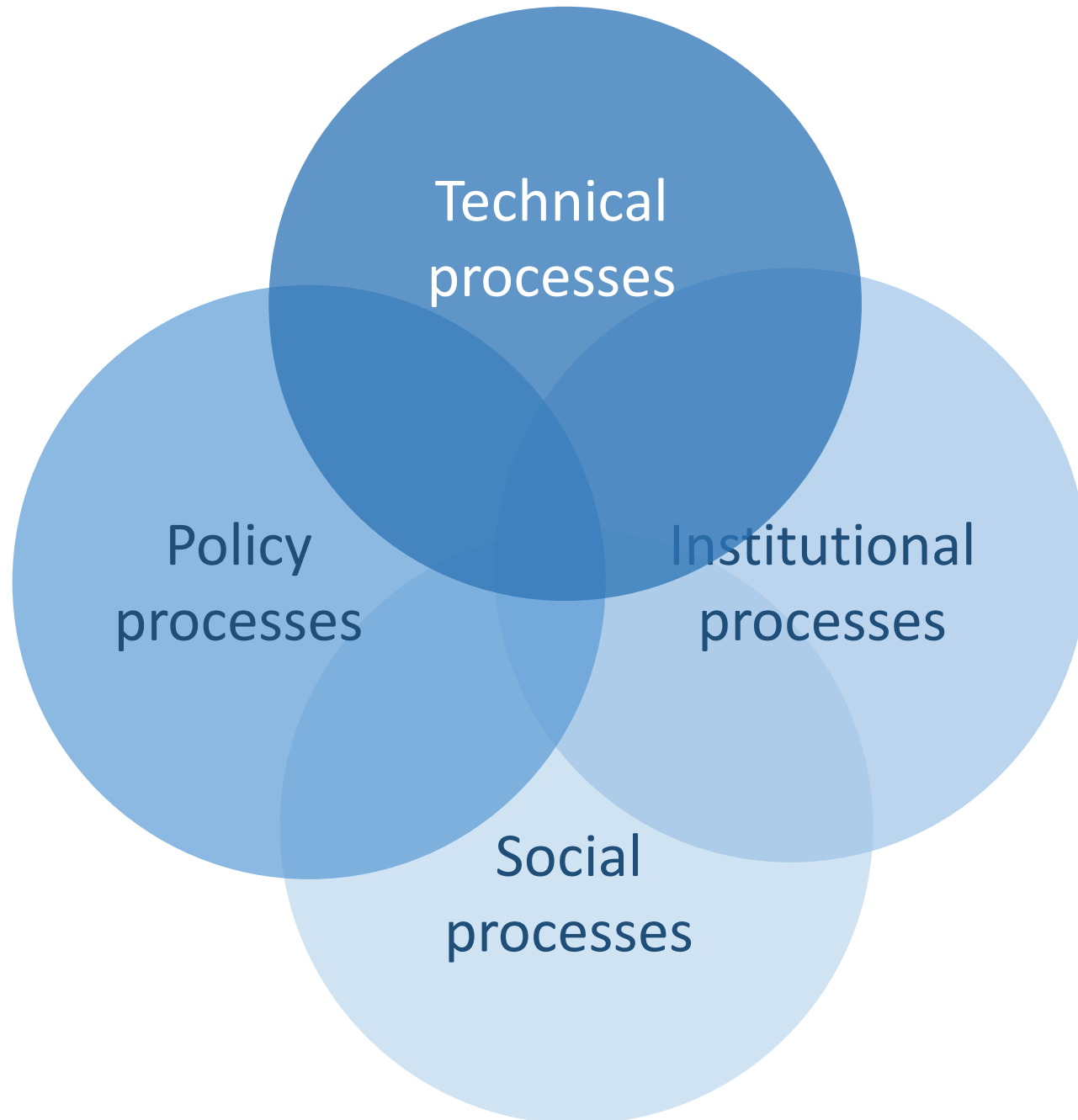
- “Comparative grid” for ecosystem services accounts – unpacking assumptions, approaches and methods, led by JRC
- Defining and classifying forest ecosystems
- Applying agricultural ecosystem types in the GET – small partnership project on this with IUCN

In 2025:

- Compilation guides for Indicators A.2 and B.1

Key ingredients for implementing ecosystem accounting

Ecosystem accounting requires attention to technical, policy, institutional and social processes



**All are
equally important,
including for
operationalizing use of
EO data in EA**

Challenge/opportunity 1:
Conceptual clarity on the relationship
between land cover, land use and
ecosystem type

Challenge

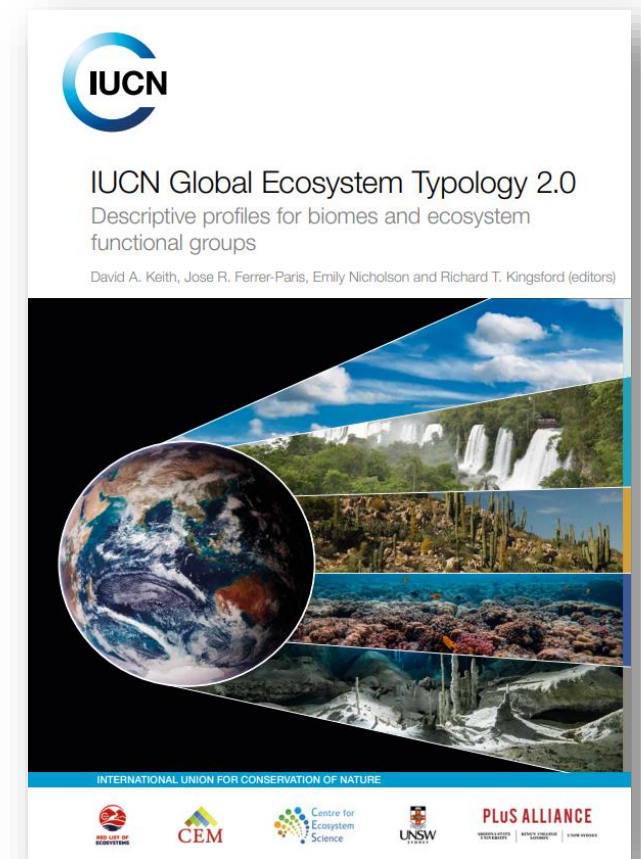
- Various understandings of the relationship between LC/LU and ecosystem types
- Perception and practice persists that LC/LU classes are a good proxy for terrestrial ecosystem types in general
 - Only in specific cases – mainly for anthropogenic ecosystem types that are heavily influenced by land use
- Sometimes the same term is used for different concepts
 - e.g. “grassland”, “forest”
 - “Grassland” in a land cover context is not the same as a grassland ecosystem
 - “Forest land” (FAO definition) is not the same as a forest ecosystem

Opportunity

- **Align our understanding of ecosystem types with the ecosystem concept as used in the IUCN's Global Ecosystem Typology**
- IUCN is developing guidelines for cross-walking other ecosystem-related classifications to the GET – should help to provide clarity
- Deepening collaboration between the ecosystem science, EO and accounting communities
 - e.g. leverage the IUCN's network of ecosystem scientists



www.global-ecosystems.org



Challenge/opportunity 2:
In situ data for
training and validation

Challenge

- In-situ data is essential for training of models and validation of their outputs – can't leverage full potential of EO and AI without this

- BUT

- Often in limited supply
- Partial, patchy, out of date
- And/or scattered and difficult to merge

From Pavel's presentation:

- In-situ data needs
 - Careful inventory, collection, **compilation and translation**
 - Setting up of standards and tools for **data interoperability**
 - **Gaps to be fill in!**
 - To be **abundant enough** to allow training of AI solution

- Need for in-situ data discussed in several places in the State of the Art review and in presentations, and identified as a key limiting factor in the draft roadmap...
- ...but not much focus on how to address this

Opportunity

- EO community could provide strategic guidance on what types of in-situ data are needed in different contexts, and suggest innovative methods for gathering this data
 - Could help to unlock effort and resources
- GET ecosystem functional groups are emerging as a level that is useful for global comparison and reporting
 - Opportunity to build training datasets per EFG, as a public resource – proposed as part of Global Ecosystems Atlas
- Requires strategic partnerships
- Potential role for citizen science

Challenge/opportunity 3: Guidance to compilers of accounts

Challenge

- Providing guidance for compilers of accounts on use of EO-related datasets and models
- For example:
 - Strengths and weaknesses of different models
 - What to be aware of
 - Which models may be better suited/more appropriate in different contexts
 - Need for validation of outputs of models, and options for this
 - From quick sense-check or visual comparison...
 - ...to formal accuracy assessment
 - What additional data and/or expert elicitation is needed?

Opportunity

- Further investment in Aries4People and ARIES for SEEA – could include such guidelines?