



# Expanding the field of ES practitioners— 18 benefits from using classification systems

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with

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# Imagine

- No definition for schizophrenia
- No list of symptoms for HIV
- 10 definitions for “fast food restaurant”
- A species being placed in 4 families

# Outline

- Introduction
- History of ES classification systems
- 18 benefits of ES classification systems (ES-CS)
- Costs benefit analysis
- Transition

# Introduction

# Classification systems have proven value

- Knowledge workers spend 20-35% of their time searching for data, with a 50% success rate
- Data collection and preparation is 60% of the time needed for environmental modeling
- Reuters saved \$90 million with a CS
- One poor CS costs 10,000 organizations \$10 million annually

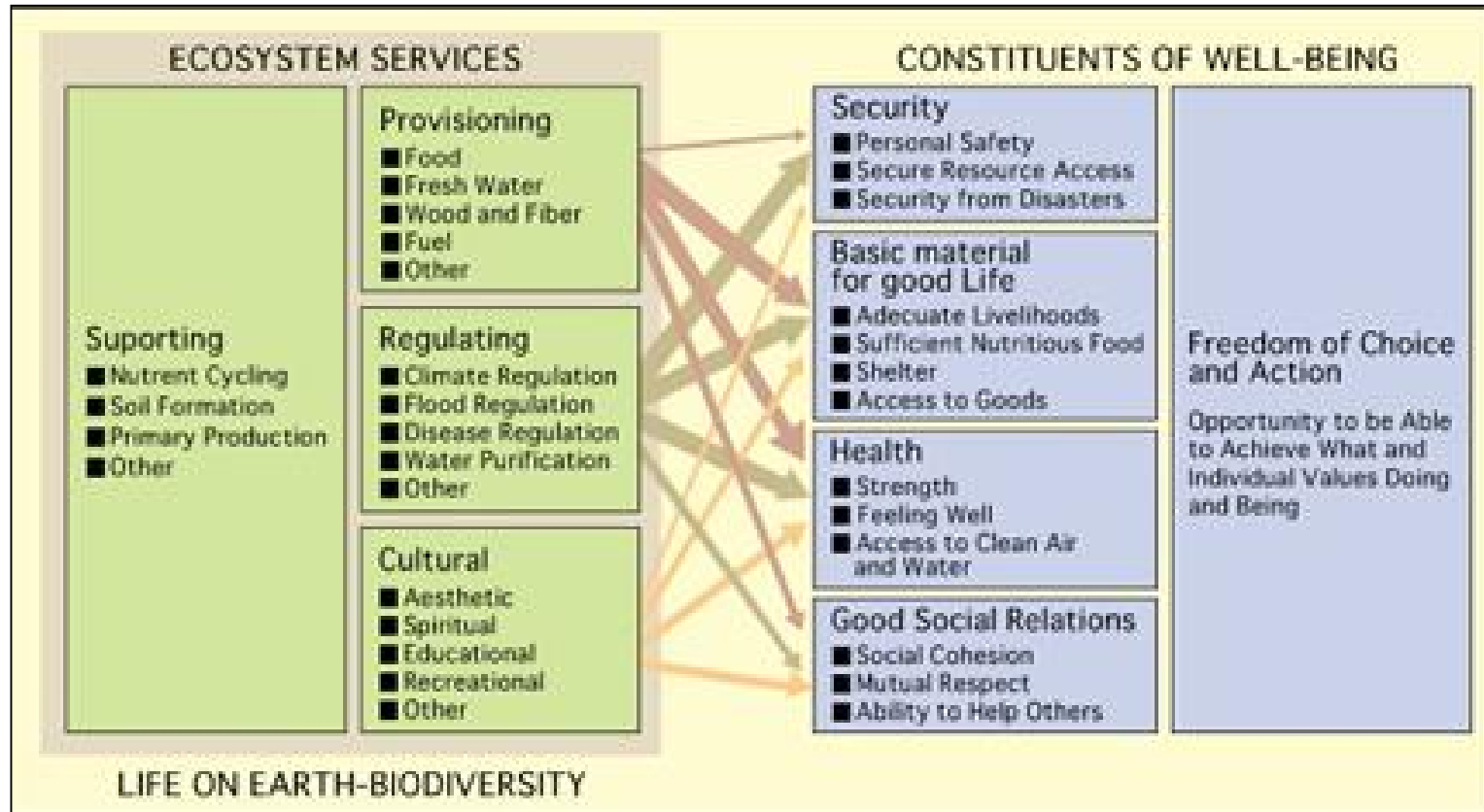
# ES-CS likely to spur 18 benefits, including:

- Unified language
- More appropriate metrics
- Improved knowledge sharing
  - Benefit transfer, scaling, regional assessments
  - Data interoperability
- More precise ES efforts



# History

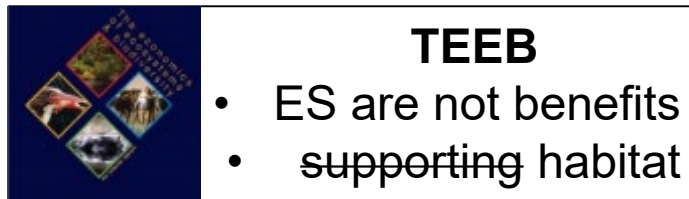
# Origins of present “grouping standard”



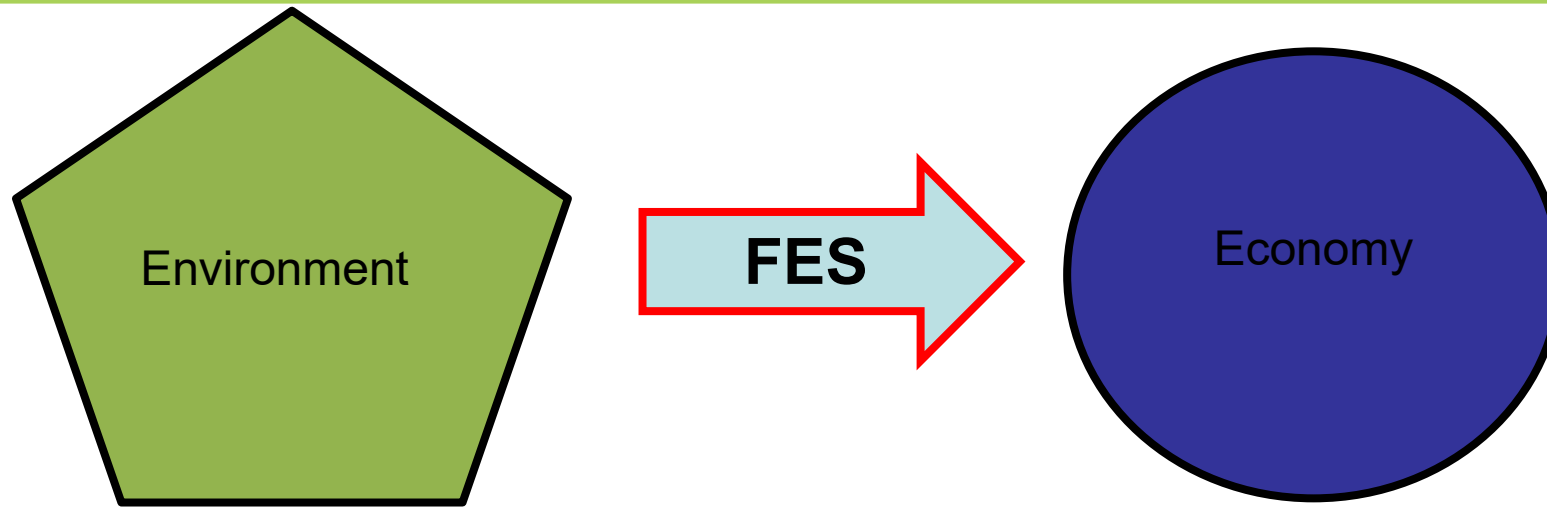
“These categories overlap extensively, and the purpose is not to establish a taxonomy but rather to ensure that the analysis addresses the entire range of services.” ([MA, 2003, page 38](#)).



# Several groupings and classifications emerged



# Final ecosystem services



- **Transition point** from being predominately ecological to being predominately economic
- Defined ecological **end points**
- **Only system** discovered that can place ES into a hierarchy/classification system

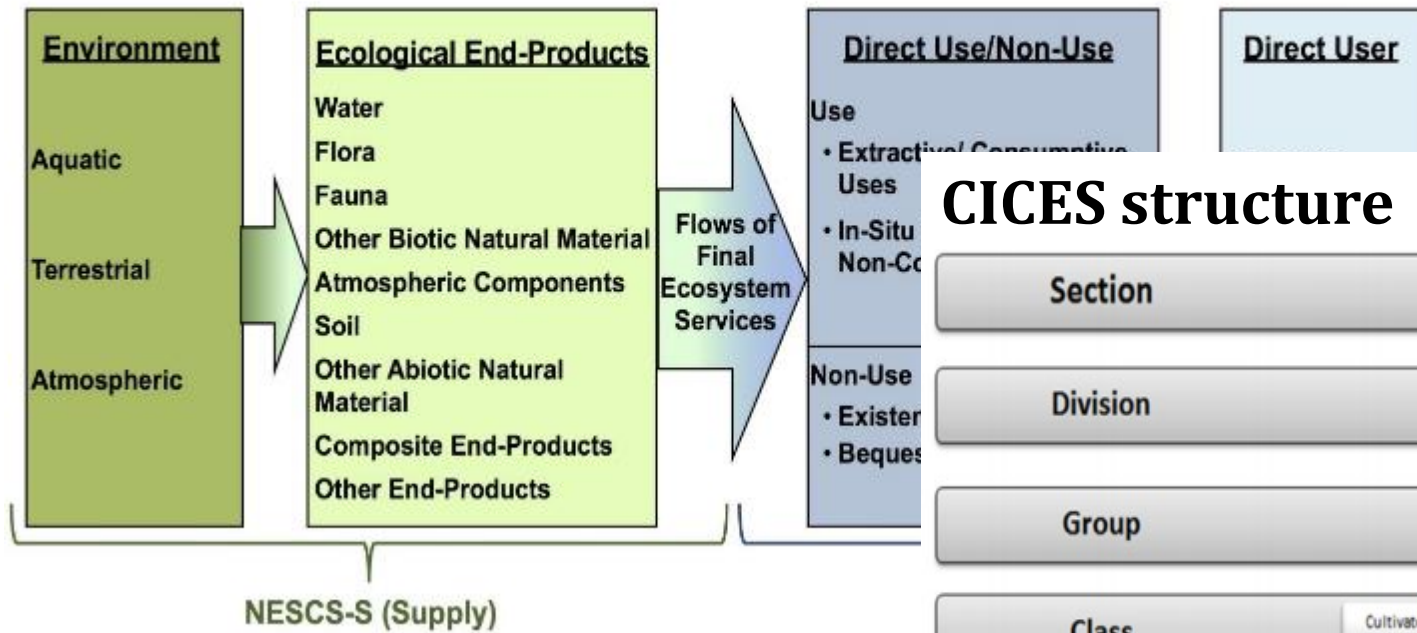
# Classification systems have a

- **Hierarchy** that nests sub-groups in a way that is:
  - Complete
  - Mutually exclusive
  - Consistent
  - Relevant
  - Balanced
  - Flexible
  - Stable
  - Comparable
- **Thesaurus** that lists all the terms related to the classification system
- **Vocabulary** that can be used to search the data

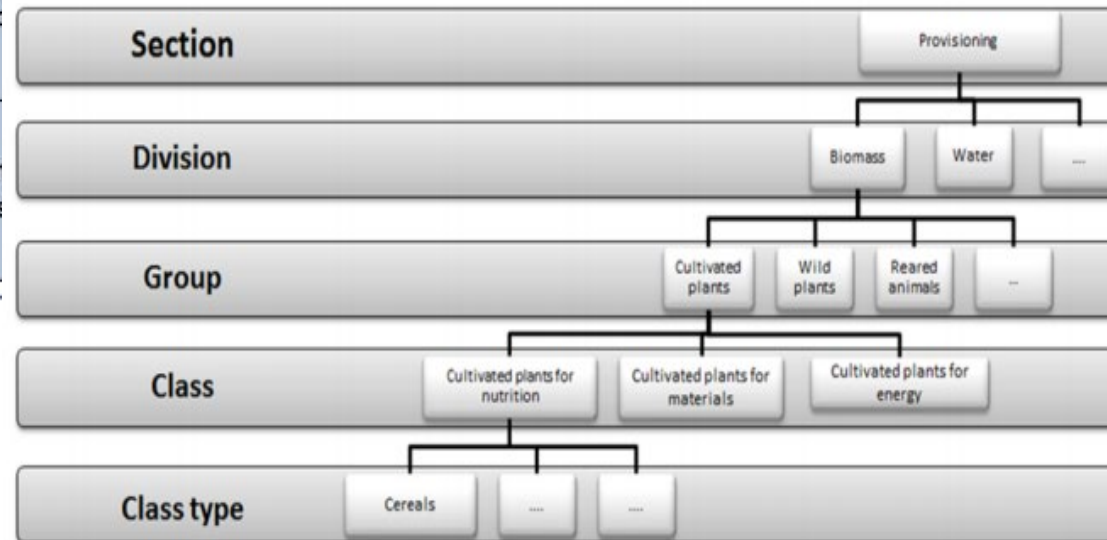


# ES-CS hierarchies

## NESCS Four-Part Classification Structure (condensed)



## CICES structure



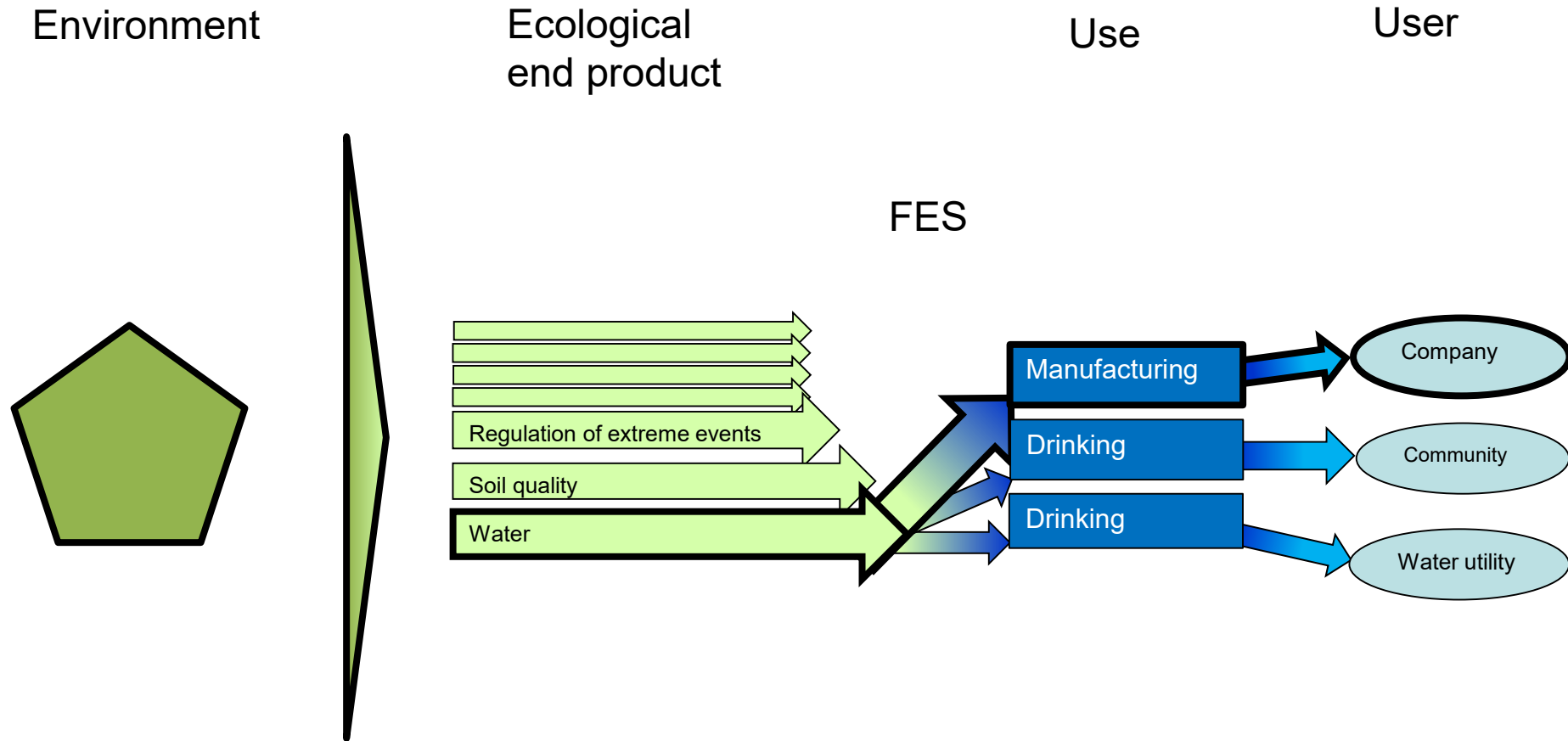
# 18 Benefits of ES-CS

		Generic Benefits		
		Defining data	Discovering data	Avoiding recreating CS
Functional Benefits	1. Unifying language			
	2. How interrelate			
	3. Improved elements, metrics, and analytical techniques			
	4. Knowledge transfer			
	5. Knowledge management			

# 1. Unifying language

	<b>Specific ES-CS terms and examples</b>		
<b>Term used in this paper</b>	<b><u>CICES</u></b>	<b><u>FEGS-CS</u></b> (to be retired)	<b><u>NESCS</u> and <u>NESCS Plus</u></b> (to be <u>retired</u> ) (from <u>FEGS-CS</u> and <u>NESCS</u> )
<b>Hierarchical level*</b> (each has nested sublevels)	Section, Division, Group, Class, Class Type	Environmental Class, Environmental Sub-Class, Beneficiary Class, Beneficiary Sub-Class	Environment, Ecological End-Products, Direct Use/Non-Use, Direct User
<b>Example elements of the FES (element)**</b>	Provisioning, Biomass, Wild Animals, Terrestrial, Nutrition	Terrestrial, Forest, Recreational, Hunting	Forest, Fauna, Hunting for Consumption, Households
<b>Code</b>	1.1.6.2	21.0604	21.3.1106.2
<b>Example of the FES the system names</b>	Food from wild animals	Recreational forest hunting	Animals in forests, hunting for household consumption

## 2. Understand how all the elements interrelate





# 3. Improved identification of elements, metrics, and analytical techniques

Avoid common mistakes, including:

1. Not having a direct user
2. Mistaking an economic input for an FES
3. Misidentifying an ecosystem characteristic, process or function as an ecological end-product
4. Failing to distinguish between a use and a user
5. Choose an FES without identified metrics

While helping to:

6. Reduce the risk of double counting
7. Simplify natural capital accounting



All from use  
of ES-CS

# 4. Improved knowledge transfer


## Semantic web:

- FAIR principles
- Linked Open Data
- Graph databases



# Cost benefit analysis

# Benefits likely far exceed costs

Costs	Benefits
<ul style="list-style-type: none"><li>• Promotion of ES-CS (ongoing)</li><li>• Updating ongoing research, tools &amp; DBs</li><li>• Building search systems (ongoing)</li><li>• Managing biases (e.g. ISO process)</li><li>• Updating ES-CS</li></ul>	<ul style="list-style-type: none"><li>• 18 benefits</li></ul>  <ul style="list-style-type: none"><li>• ES easier to teach</li></ul>

# Transition

# Transition to using ES-CS

ES practitioners should:

1. Integrate stakeholders' understanding of the “benefits of nature” with ES-CS
2. *When not using an ES-CS, clearly define the ecosystem, ecological end-product (or CICES equivalent), use, and users*
3. *Where practical, use an ES-CS*
4. *Promote the adoption of ES-CS*

# About Sustainable Flows

Sustainable Flows helps organizations improve financial and ecosystem services flows through ecosystem modeling, valuation and risk assessment that improve strategies for managing risks related to the natural environment.

We work globally with the public and private sectors to advance methods and approaches, while providing clients practical strategies for risk reduction.



# Contact

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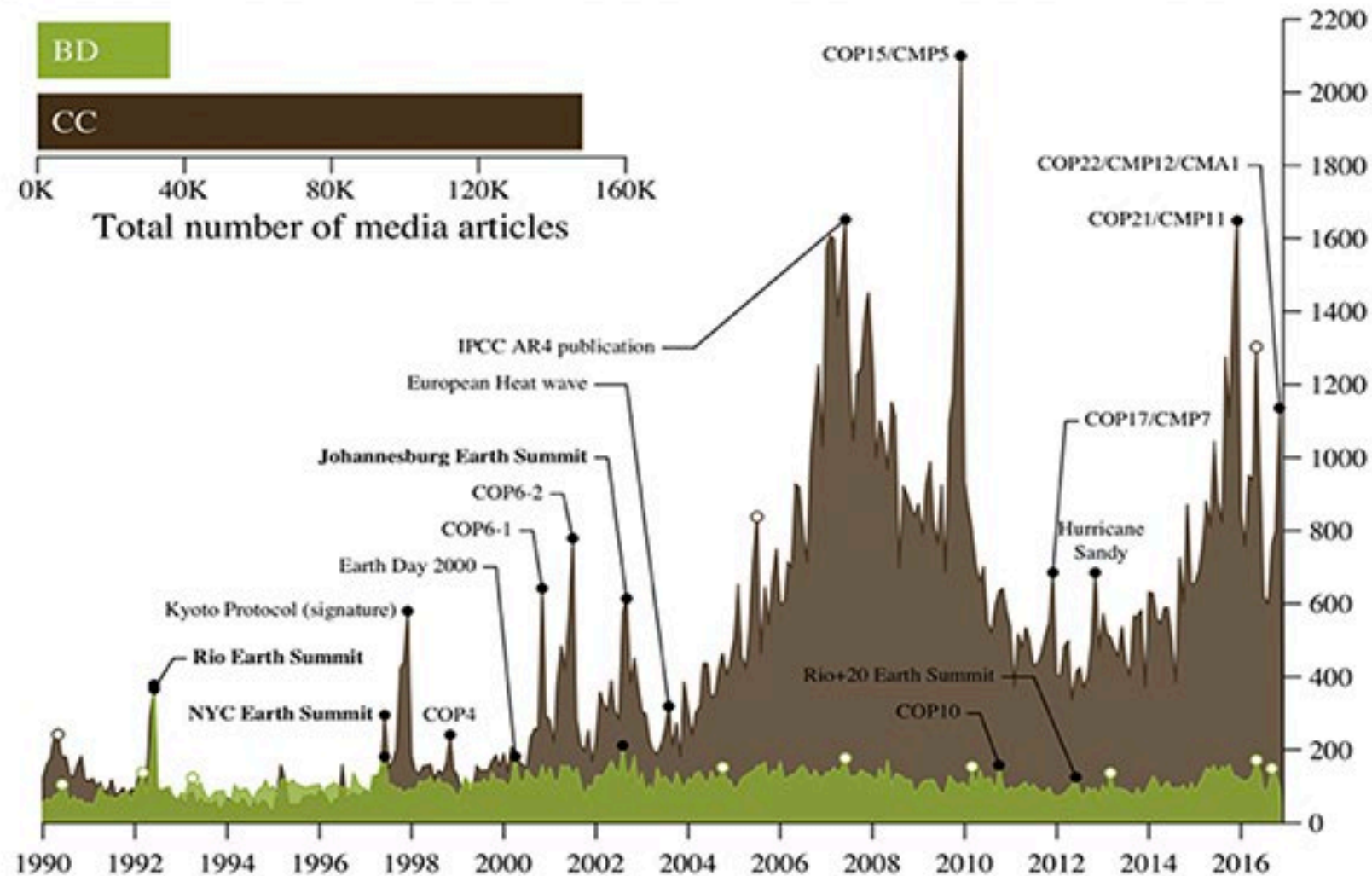




# Appendix

# 1. Unifying language

## Closing the Biodiversity Action Gap



Graph Source: Legagneux, P., N. Casajus, K. Cazelles, C. Chevallier, M. Chevrinails, L. Guéry, C. Jacquet, M. Jaffré, M. Naud, F. Noisette, P. Ropars, S. Vissault, P. Archambault, J. Bély, D. Berteaux, and D. Gravel. 2018. Our House Is Burning: Discrepancy in Climate Change vs. Biodiversity Coverage in the Media as Compared to Scientific Literature. *Front. Ecol. Evol.* <https://doi.org/10.3389/fevo.2017.00175>

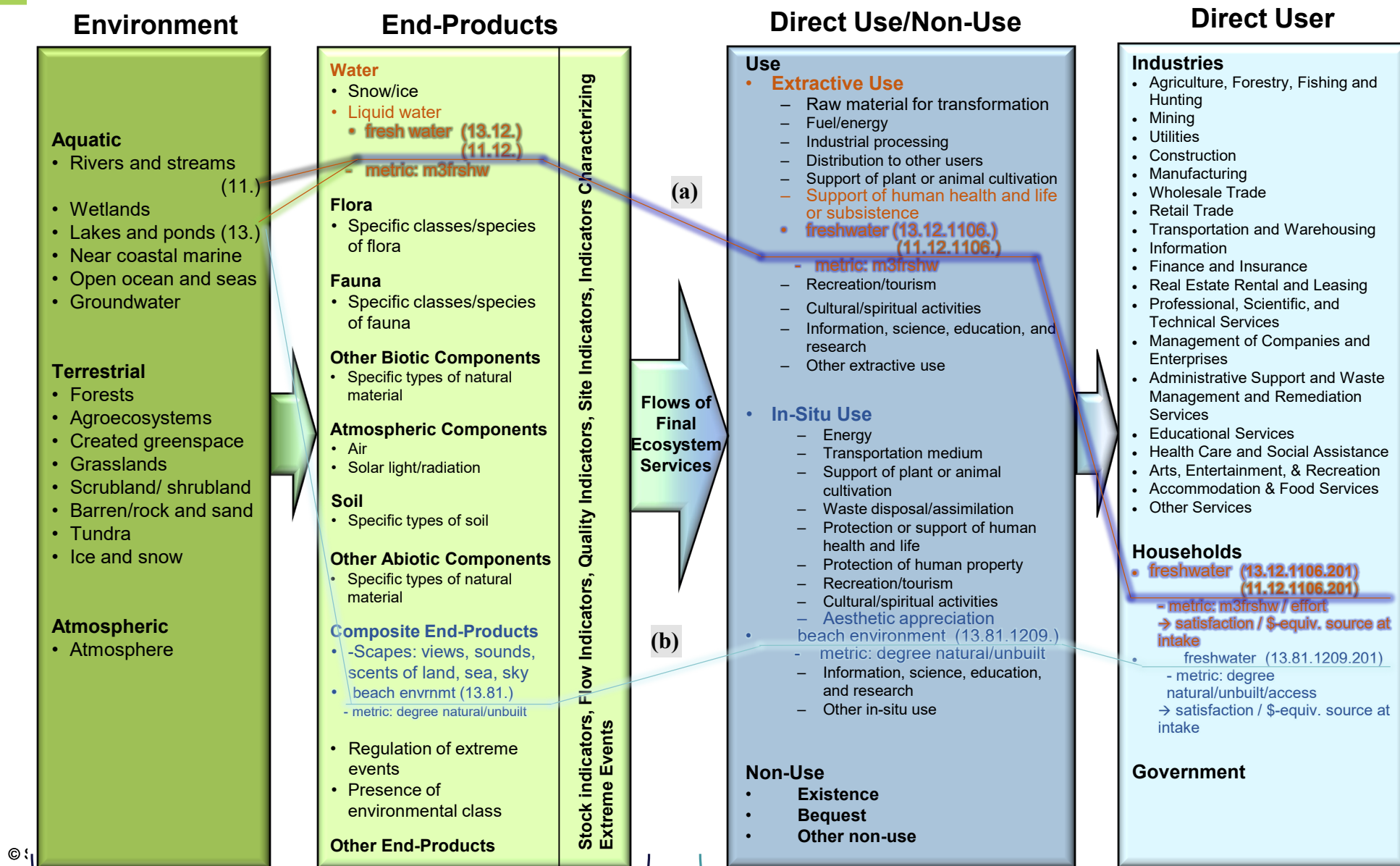
# 4. Improved knowledge transfer



- Benefit transfers
  - More precise elements and metrics
  
- Scaling
  - A. Driving greater accuracy in scaling analysis
  - B. Informing the selection of scales
  - C. Encouraging greater consistency in defining scales
  - D. Helping ensure that FES are not “lost” in scaling
  - E. Improving communications with decision makers and stakeholders



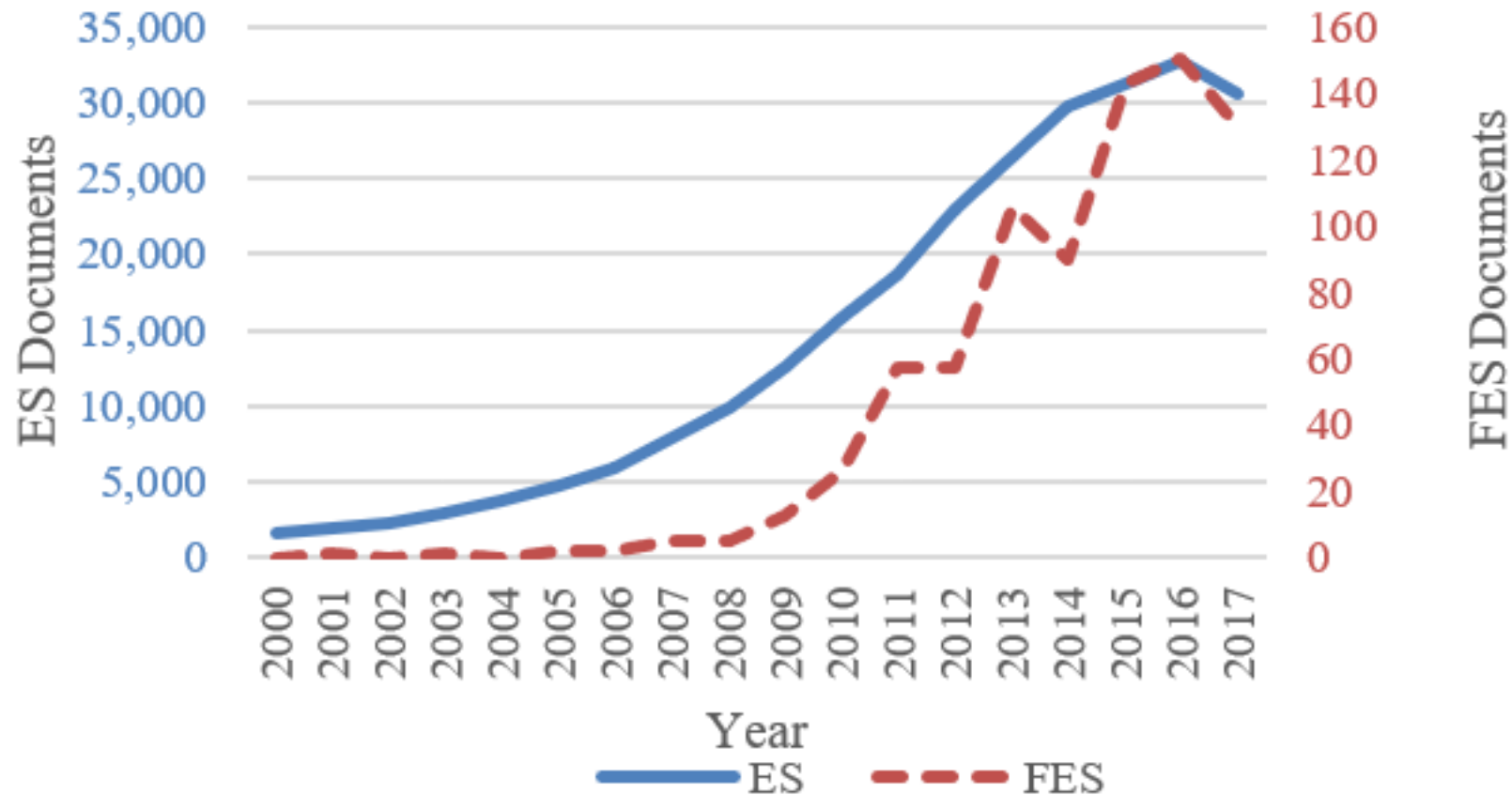
# 2. Understand how all the elements interrelate



# FES research is growing

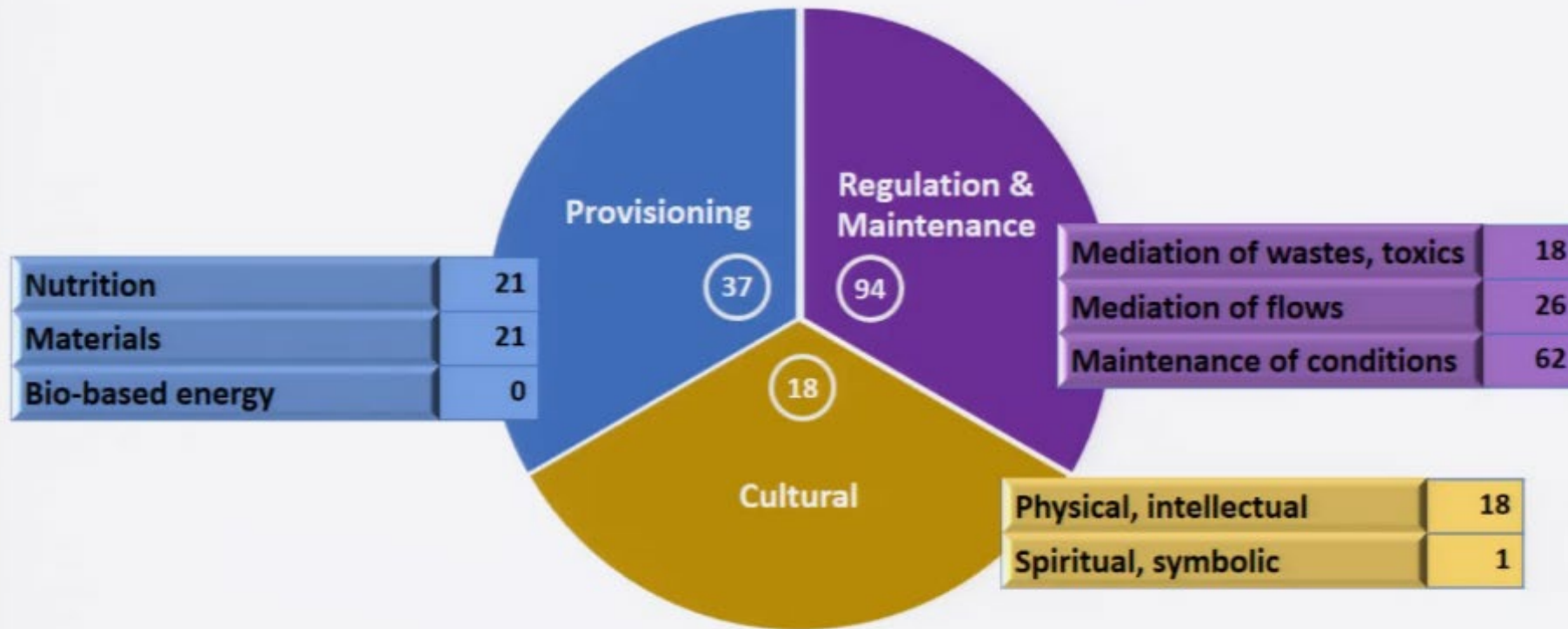
## Chart 1: ES and FES documents per year

Google Scholar hits (25 May 2018)



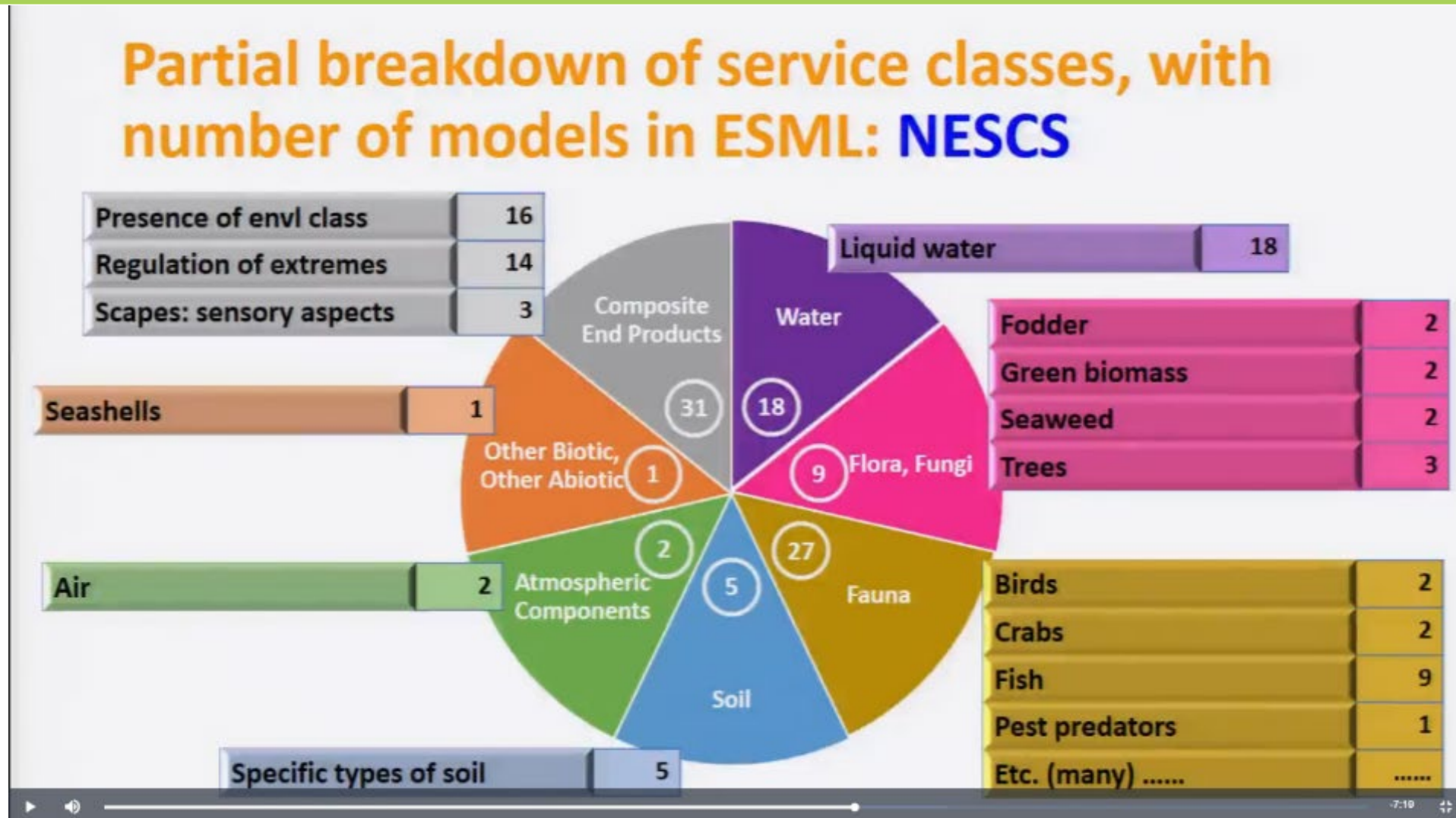
# Defining data: f. Quicker identification of research needs

## Partial breakdown of service classes, with number of models in ESML: CICES



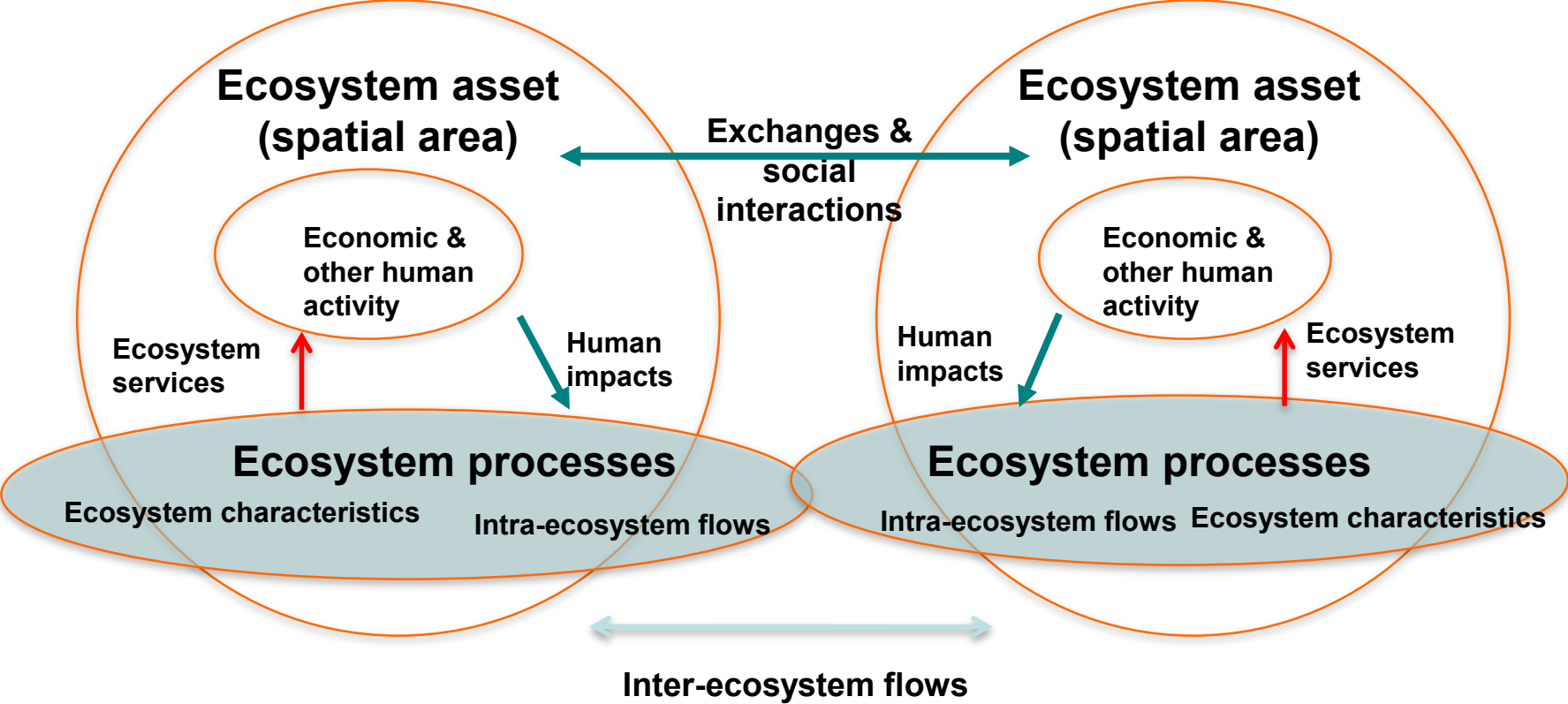


# Defining data: f. Quicker identification of research needs

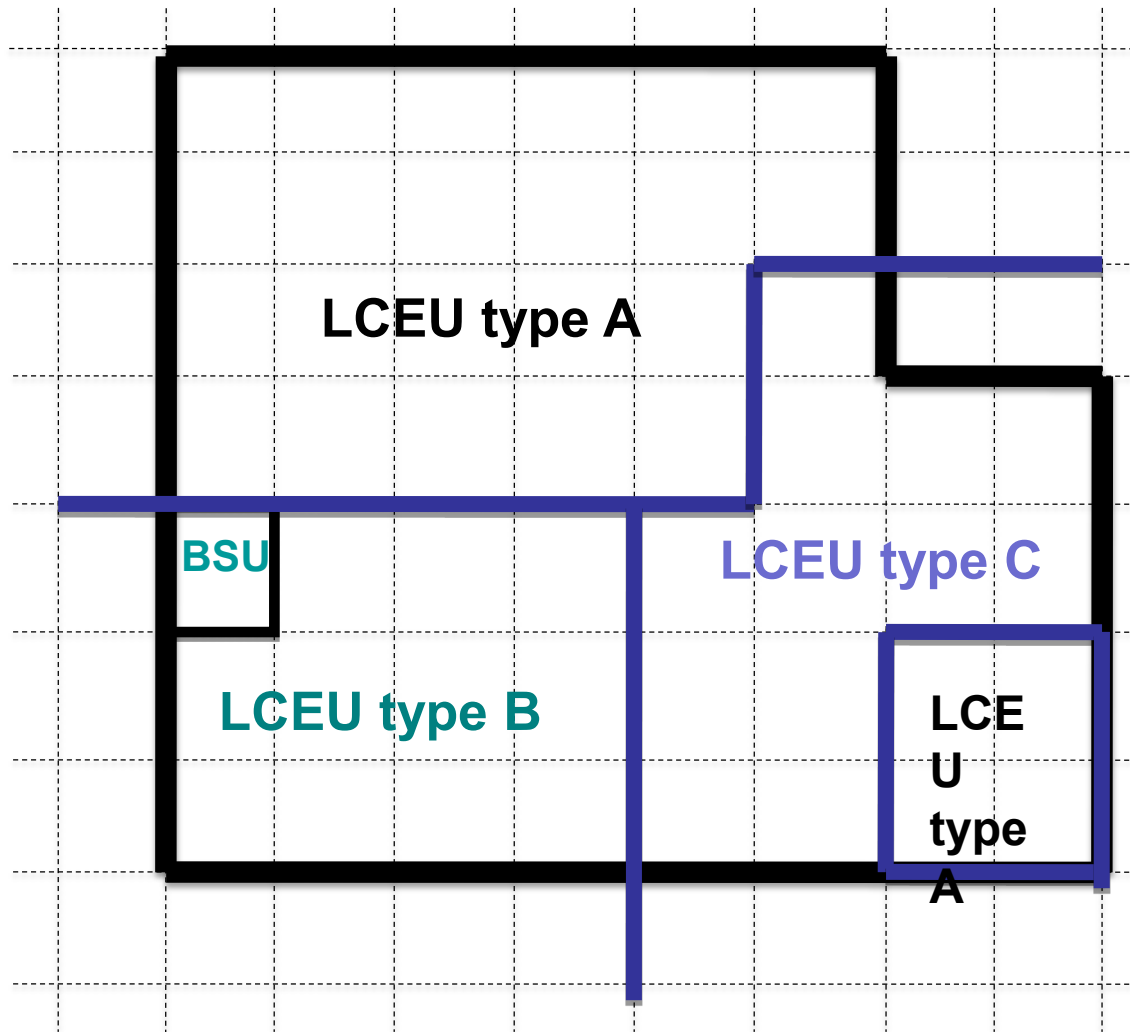




# Basic UN-SEEA accounting model



# Ecosystem Accounting Unit



# Clustering of CICES classes based on use fraction of shared indicators in published studies

