



European Environment Agency



Mapping and Assessment of Ecosystems and their Services at different spatial scales

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What is MAES?

EU Biodiversity Strategy

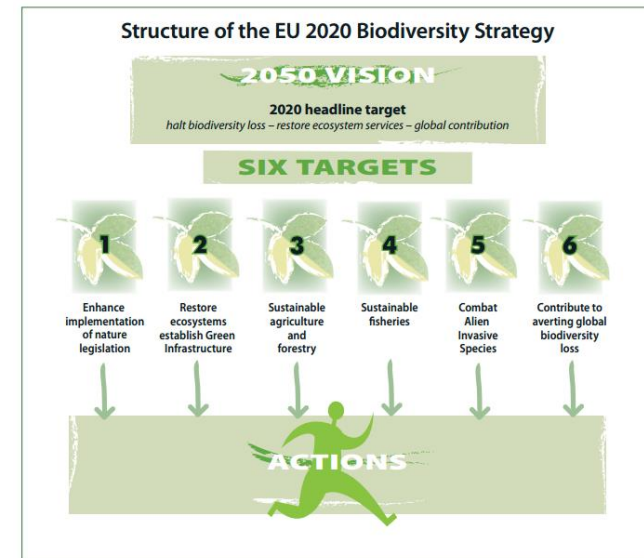
→ Halt the loss of biodiversity and ecosystem services in the EU and globally

Target 2

→ Maintain ecosystem services and restore ecosystems

Action 5

→ **Map and Assess Ecosystems** and their **Services** in the entire EU territory; economic valuation; develop natural capital accounts



MAES working group oversees the implementation of Action 5

Research community
H2020 projects

www.esmeralda-project.eu

European Commission,
European Environment Agency

Cities and regions
Stakeholders

EU Member States
and other countries



TASKS of the Working group

1. *Guidance for member states (MAES reports)*
2. *Common ecosystem assessment pilots (on urban, agri, forest, water, nature)*
3. *EU wide assessments (JRC and EEA)*

MAES working streams

Member States

- Mapping and assessment at national scale
- Work is ongoing in many countries

MAES working group

- MAES reports provide guidance
- Thematic pilots to test the guidance

ENV Support contracts (MESEU/TRAIN/T2)

- Contracts DG ENV
- Guidance and training at MS level

ESMERALDA

- Horizon 2020
- Flexible approach to mapping and assessment

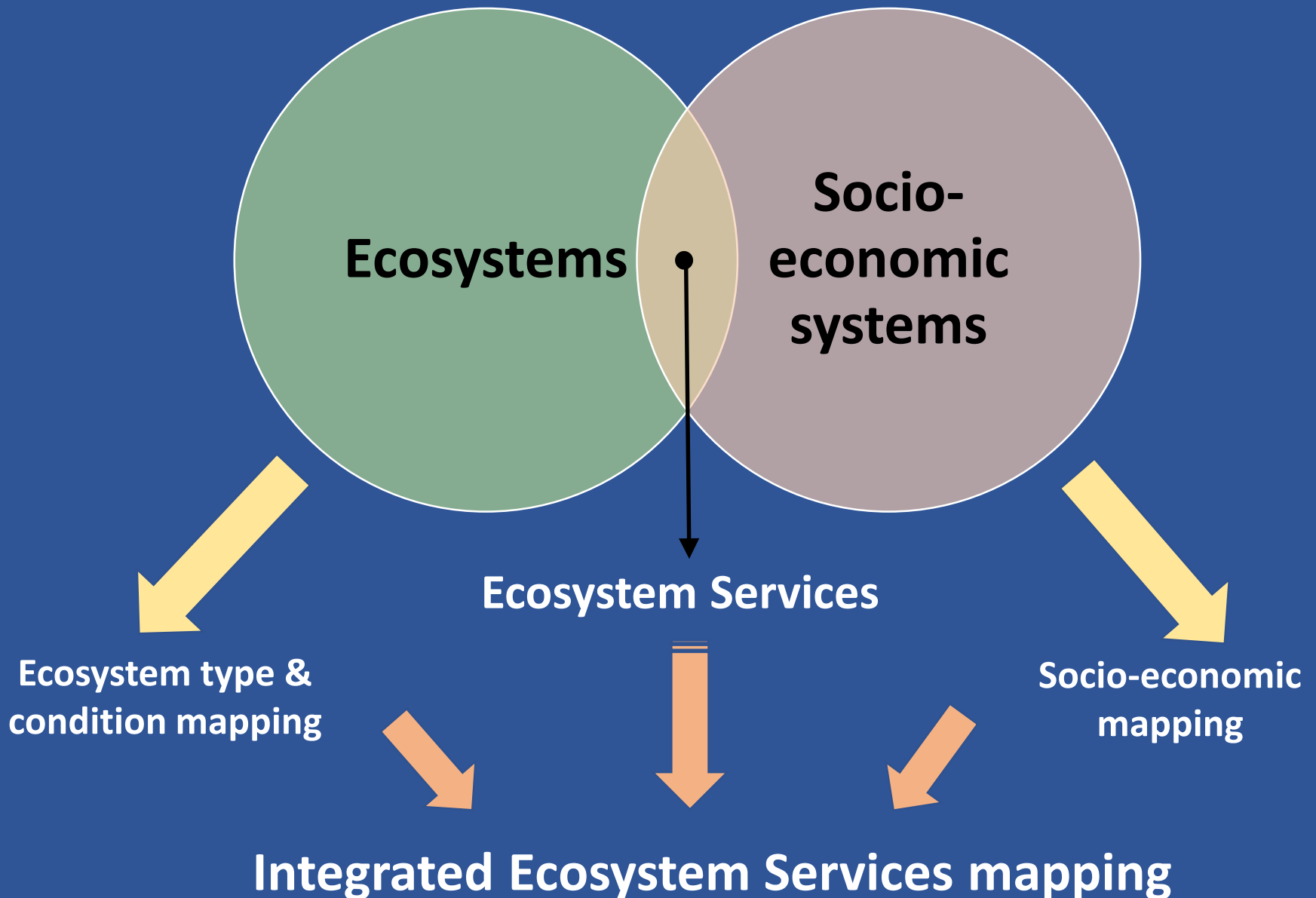
IPBES

- Regional assessments

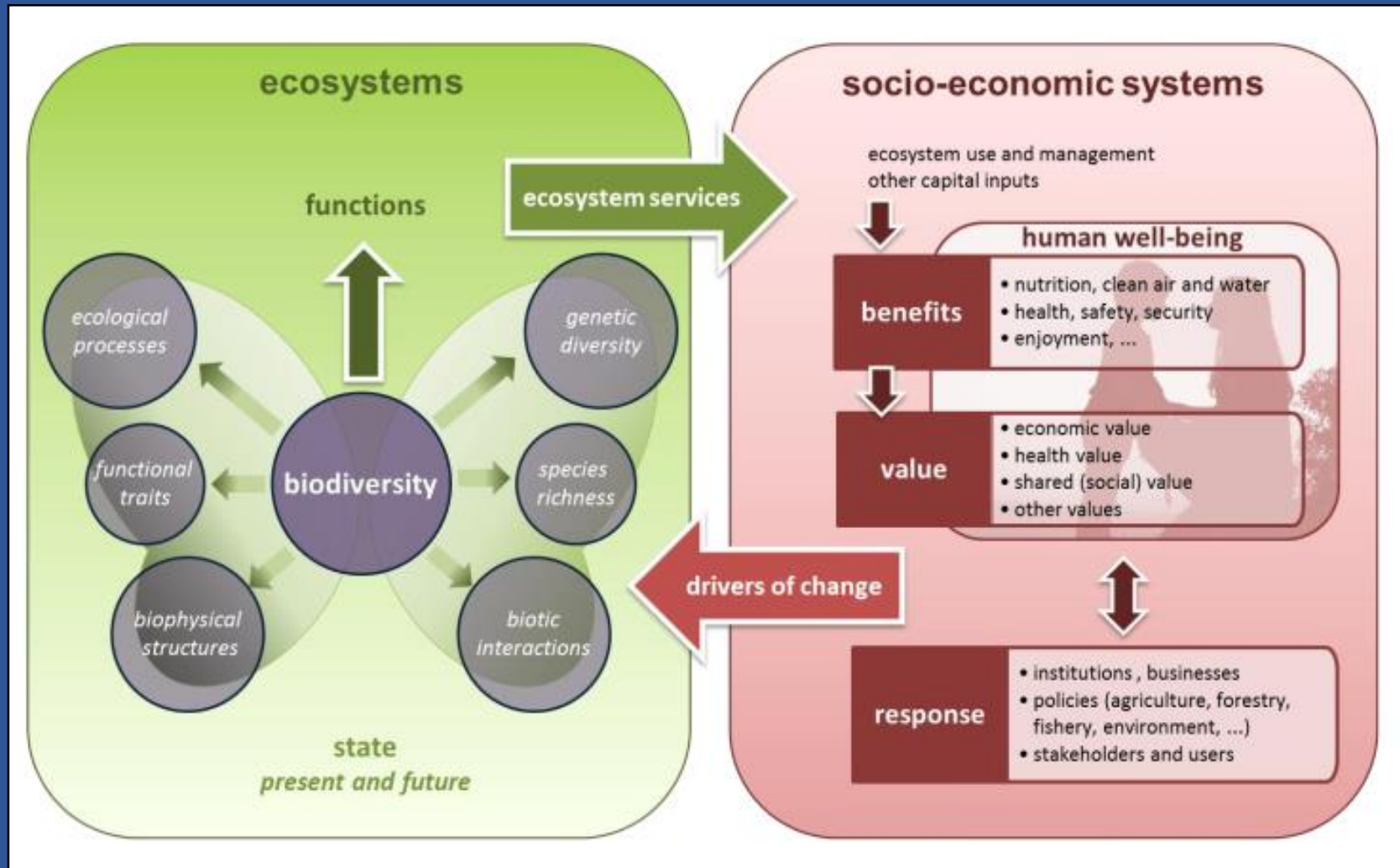
KIP-INCA

- Integrated system of Natural Capital Accounts
- Depends heavily on MAES inputs

MAES Conceptual framework

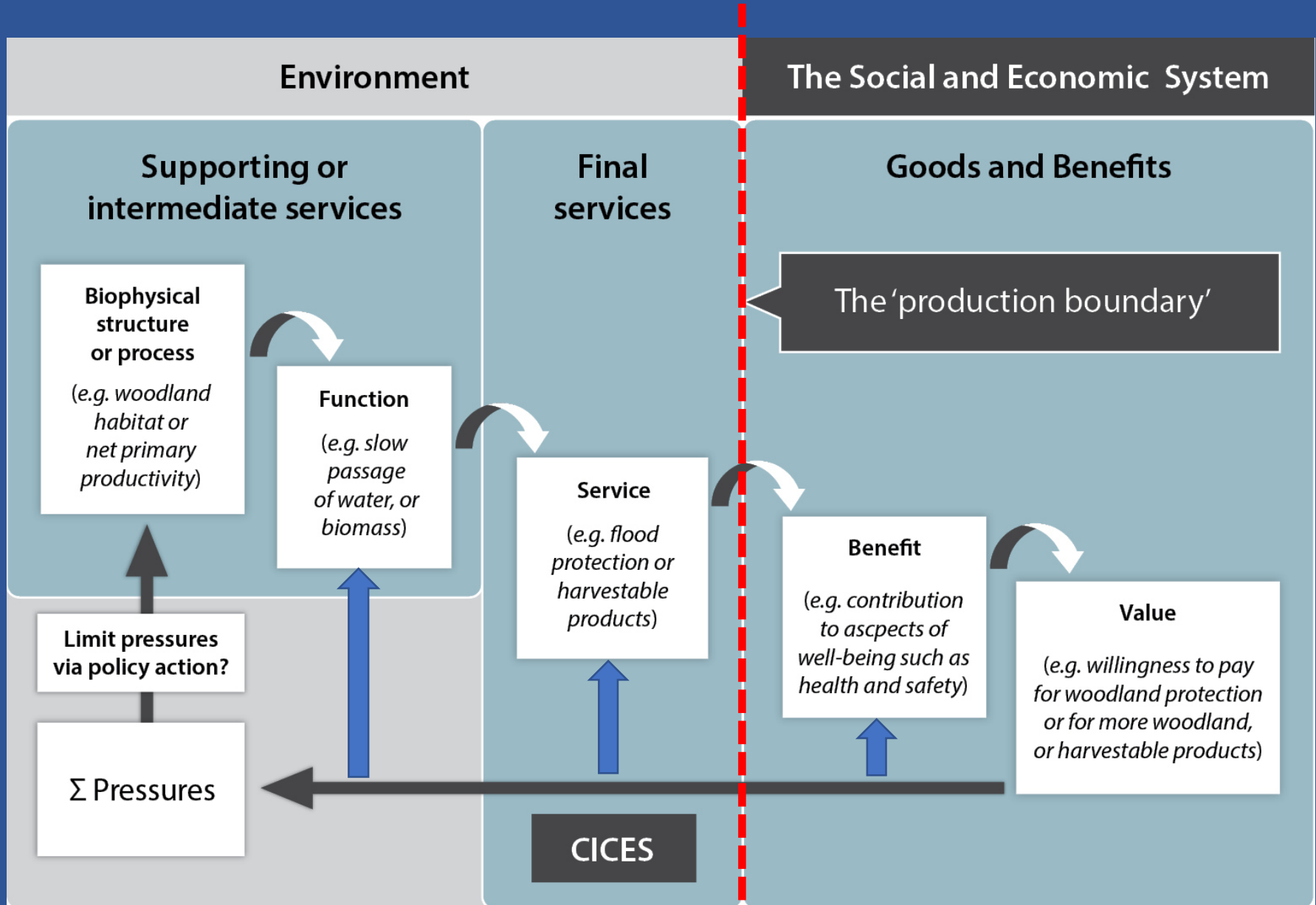


Conceptual framework for EU wide ecosystem assessments (Maes et al. 2013)



- Mapping and Assessment of Ecosystem Services (ES) should be implemented at a scale that each parameter of the framework needs to be studied and evaluated.

The cascade model (Potschin & Haines-Young 2011, 2017)

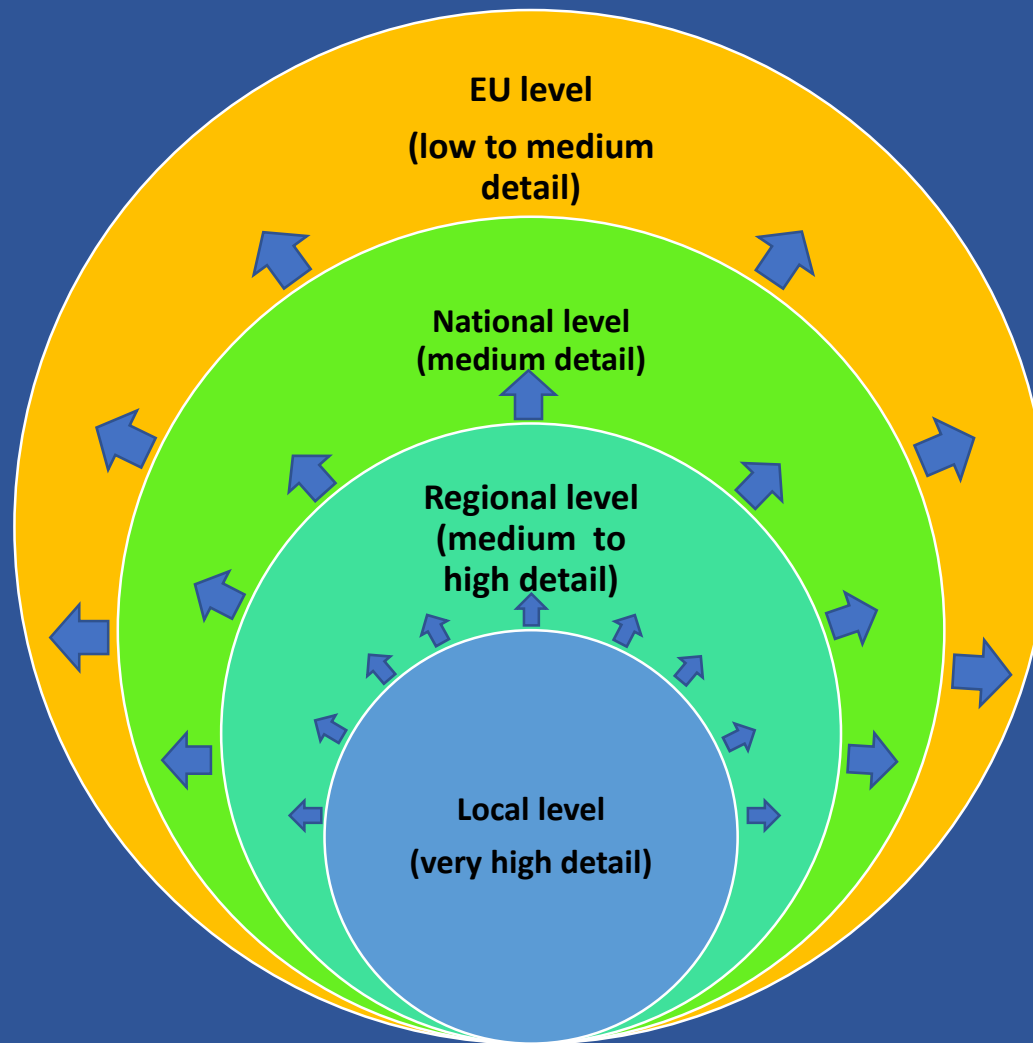


The need of implementing MAES at different spatial scales

- **EU and National Biodiversity Strategies implementation.**
- **Identification of ecosystem pressures/threats at various scales for the selection and implementation of conservation actions.**
- **Identification and assessment of areas that provide unique ES using a wide spectrum of spatial scales (Global, EU, national, regional, local).**
- **A Policy – Decision making support tool that combines and exploits the outputs from EU to local level assessments, aiming to safeguard the natural capital and human well-being at all levels.**

Mapping needs & scales

EU level	National level	Regional level	Local level
Ecosystem type & condition	Ecosystem type & condition	Biophysical & socio-economic mapping	Ecosystem functions
Ecosystems' condition in protected areas	Ecosystems' condition in protected areas	Ecosystem services mapping & prioritization	Ecosystem services mapping
Conservation objectives	Conservation objectives	ES demand	ES demand
Conservation actions	Conservation actions	ES flows	ES flows
Spatial distribution of Ecosystem services within EU	National set of ES indicators	Drivers of change	ES valuation
EU Natural Capital Accounting	Ecosystem services index, mapping , ES hot-spot identification & prioritization	ES valuation	Drivers of change and contrasting, future scenarios mapping and assessment
-	National Natural Capital Accounting	Regional Natural Capital Accounting	Contribution to the regional and national capital



Number of studies at lower than EU level

None

Many

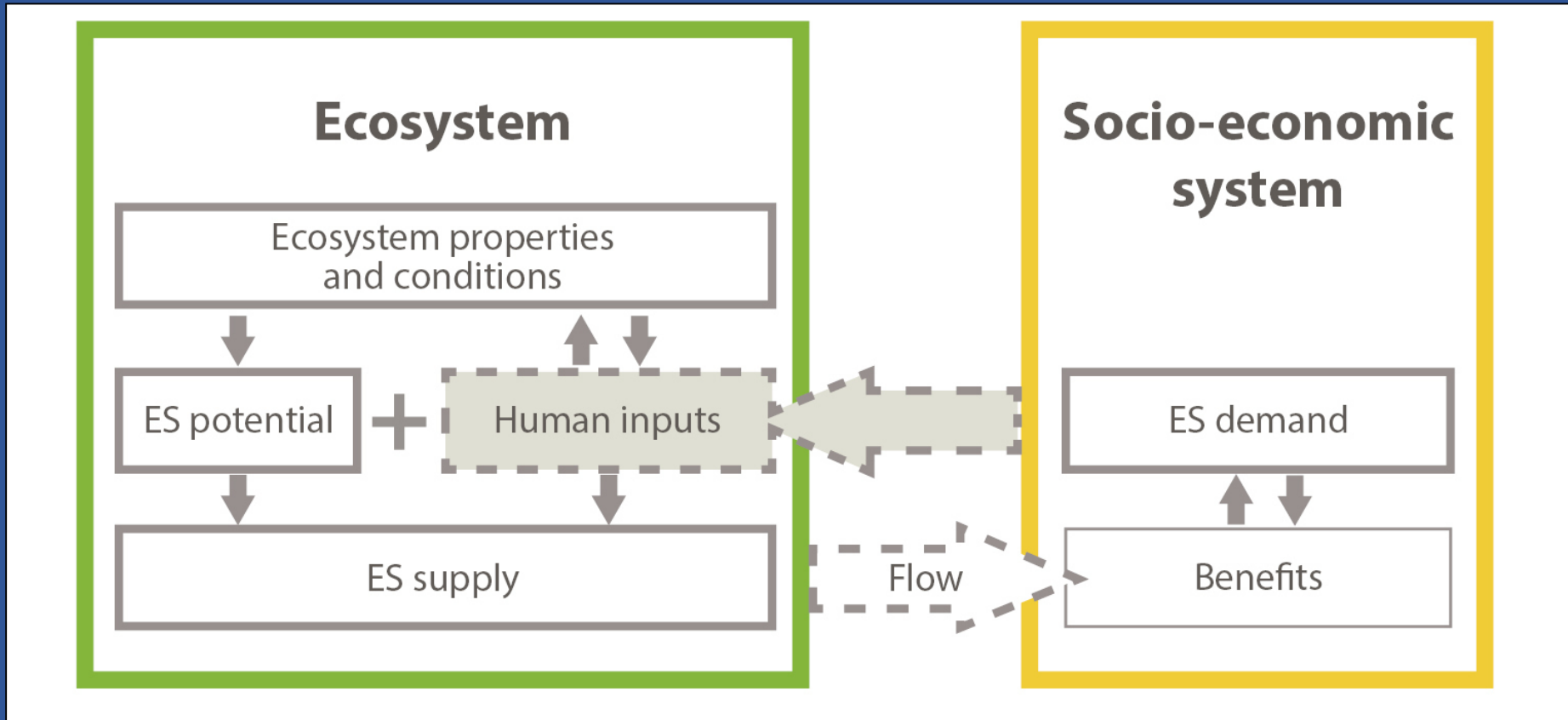
Very low

DETAIL OF MAPPING & ASSESSMENT AT EU LEVEL DEPENDING ON THE NUMBER OF STUDIES AT LOWER LEVELS

Very high

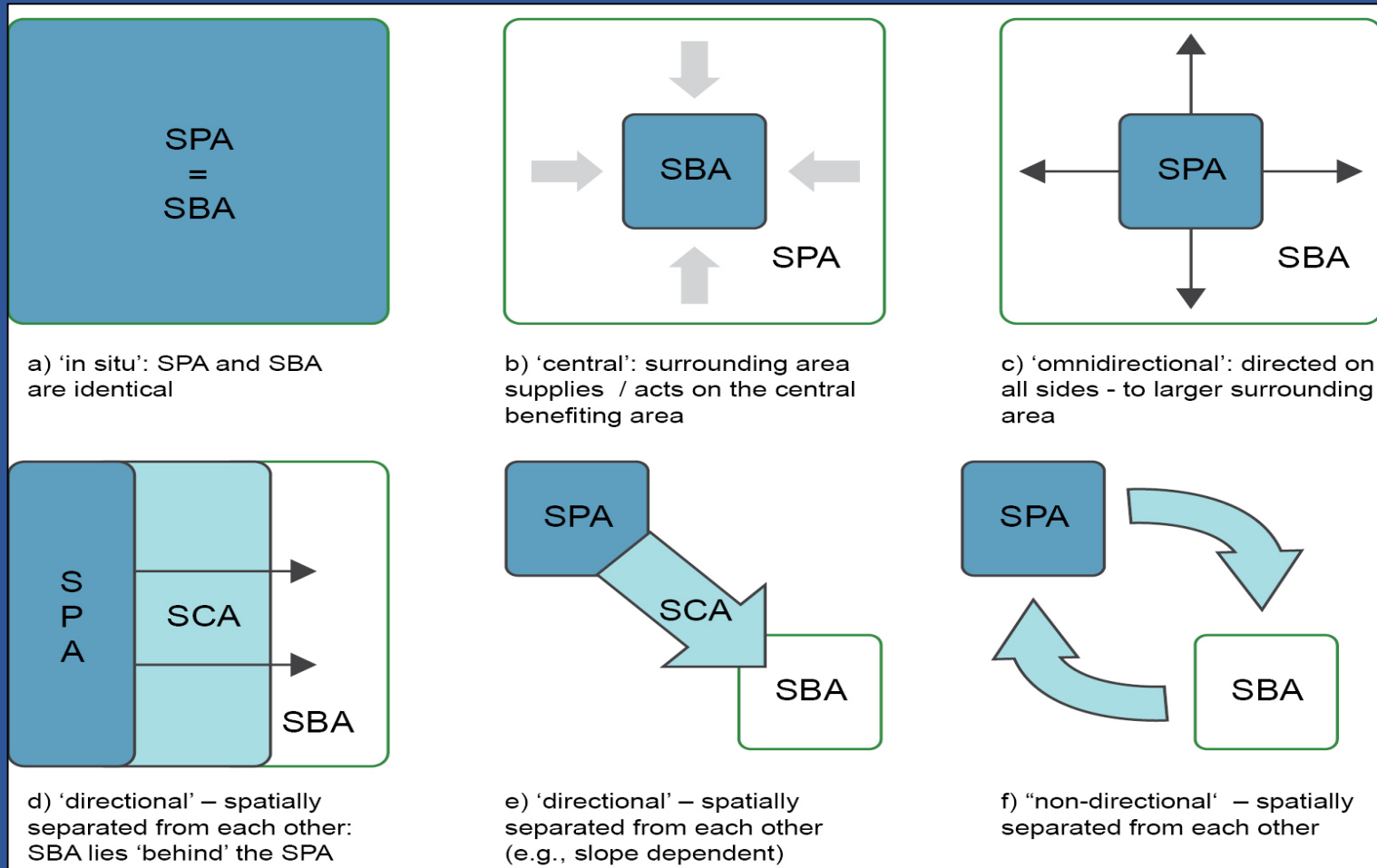
What, Where, when & why to map

What: Select mapping objectives on the basis of a) conservation and socio-economic assessment needs, b) policy questions and needs.



Mapping aspects of ES (Syrbe et al. 2017 illustration, adapted version of the ES cascade by Haines-Young & Potschin, Wolff et al. 2015, Bastian et al. 2013). Bold grey: subjects relevant for mapping; dashed: may be mapped; thin: additional aspects for which mapping could be developed.

Where: Depending on the information needed, we can map and assess ES at Service Providing Areas (SPA) or/and at Service Benefiting Areas (SBA). The mapping scales vary according to the purpose of the assessment.



Types of spatial relations of Service Providing Areas (SPA), Service Benefiting Areas (SBA) and Service Connecting Areas (SCA) (Walz et al., 2017; adapted and extended from Fisher et al. 2009; Syrbe and Walz 2012).

When: Mapping and assessment at temporal scales guides the proper spatial scale

- Mapping at various temporal scales
 - a) is needed for the evaluation of changes in time
 - b) highlights trends, tradeoffs and diagnoses mapping needs at more detailed spatial and/or thematic scales

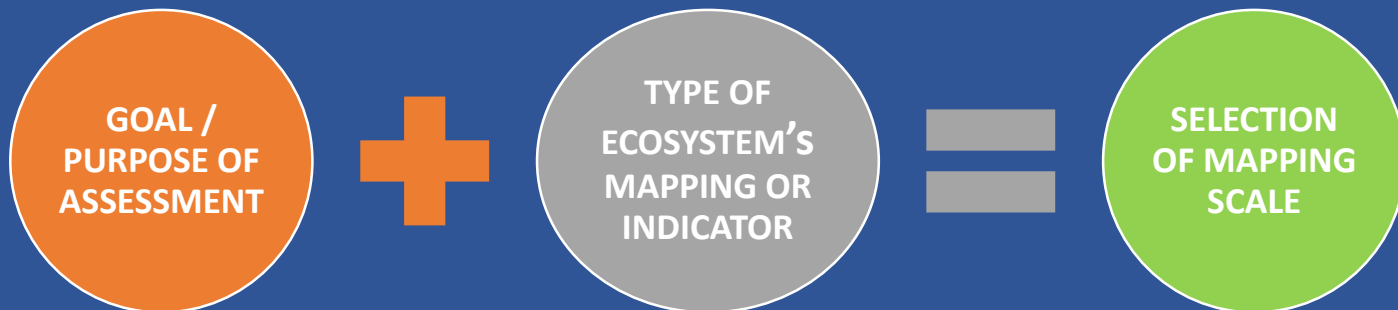
For example:

Large scale 5-year period assessment -> Land use change models -> **If change is detected then -> Fine scale spatial assessment**

- Fine scale spatial assessments are needed in specific time periods for bio-monitoring processes and ES monitoring assessments at predefined sites / plots

Why: Reasonable ES mapping and assessments (proper selection of assessment scale)

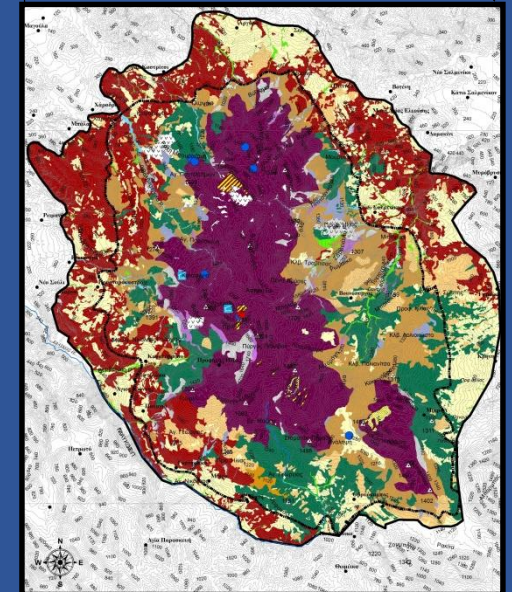
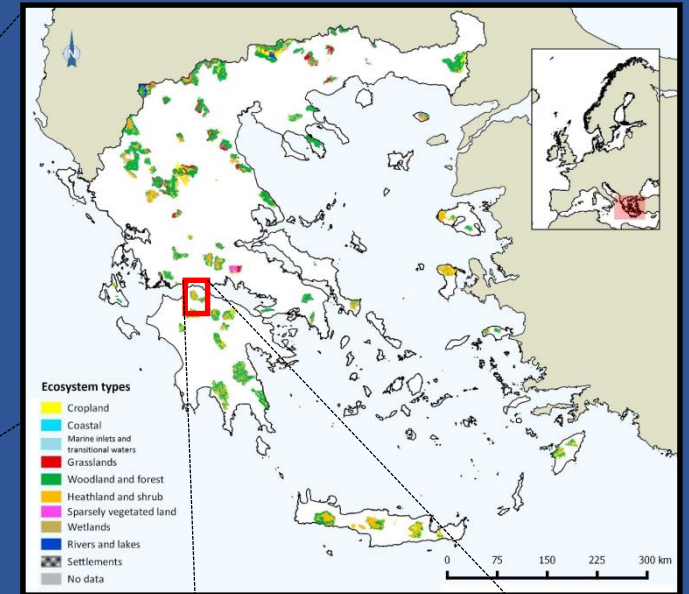
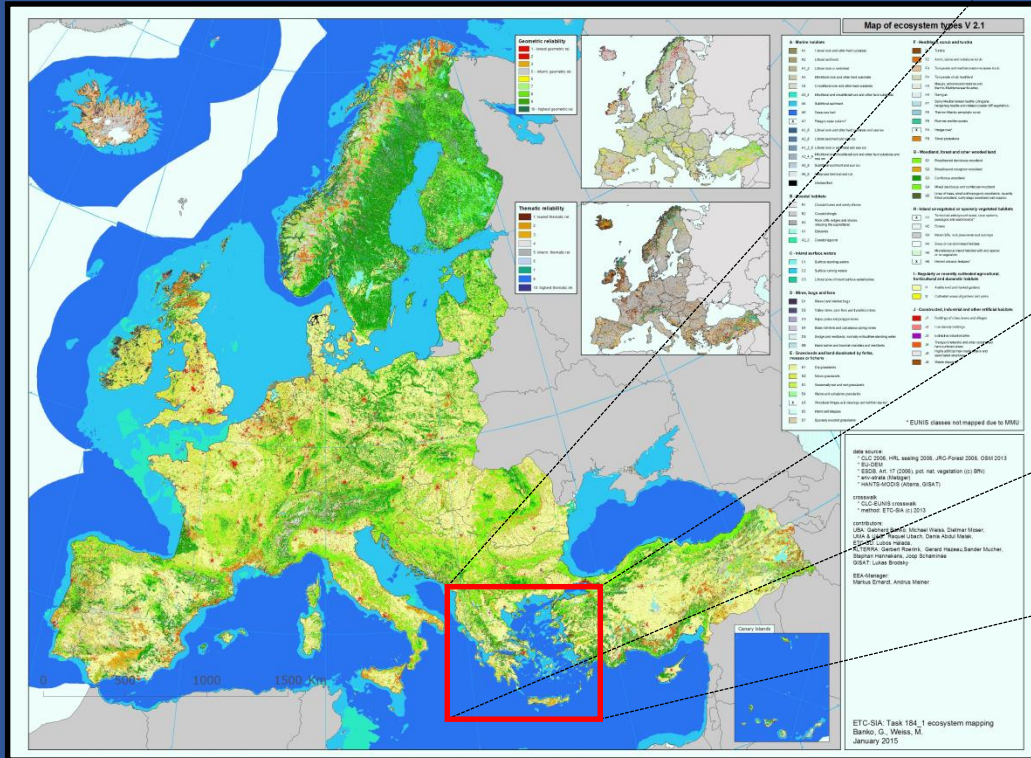
- ES assessments are being conducted for various purposes
- Some purposes of higher importance are mapped at finer scales
- Not a common ES assessment scale is appropriate for all ES/ES indicators
- **The finest scale is not always the most appropriate, depending on the scope of the assessment;** e.g. some extensive assessments on ES valuation of a wetland resulted in false results, while the economic data highlighted that the more pollutants the wetland handles, the better for its ES financial value (no economic scale assessment is needed in this case or it should be modified to a broader one)



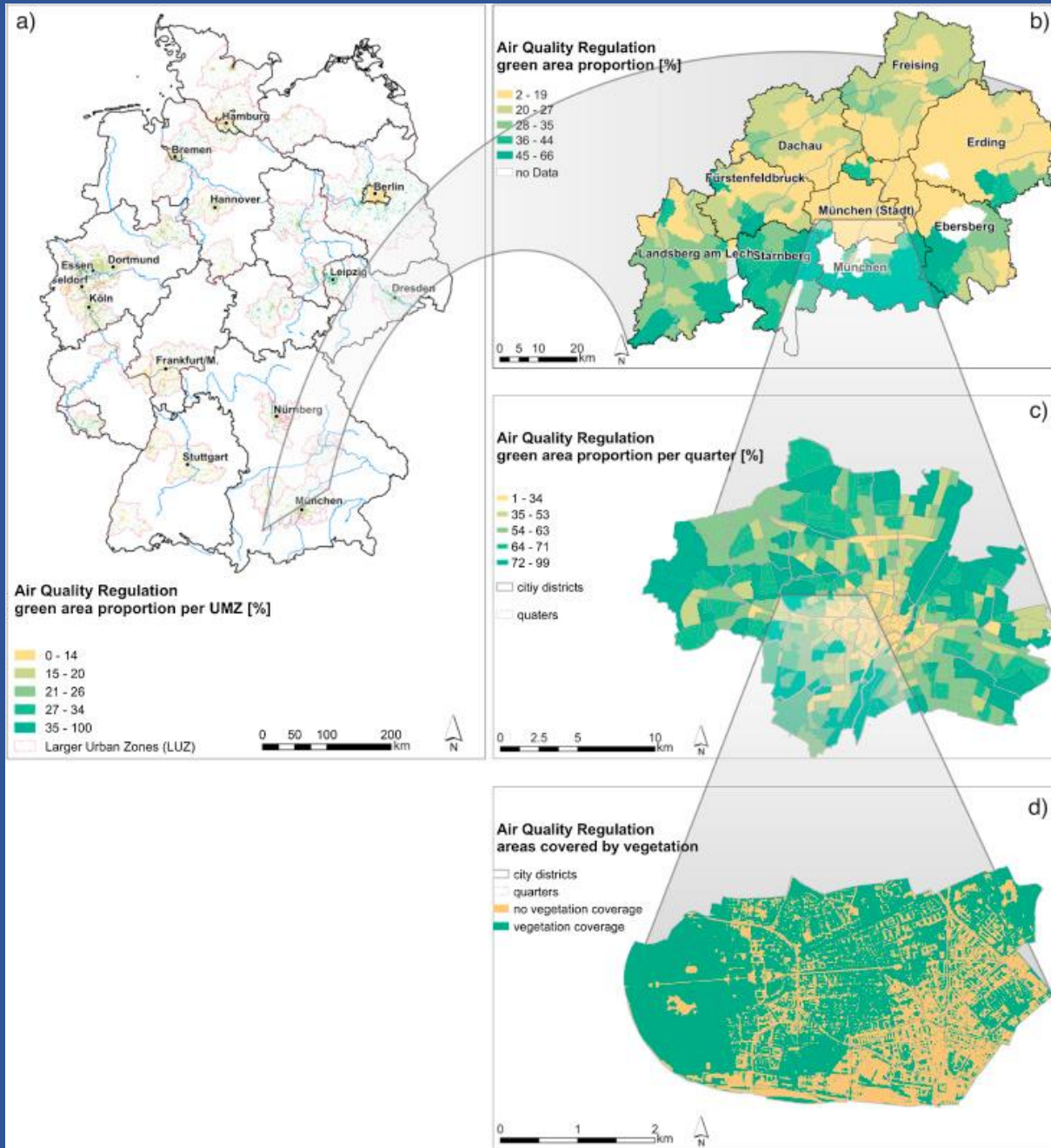
Data needed for the various ES assessments and mapping



Ecosystem type mapping at different scales



Ecosystem services mapping at different scales

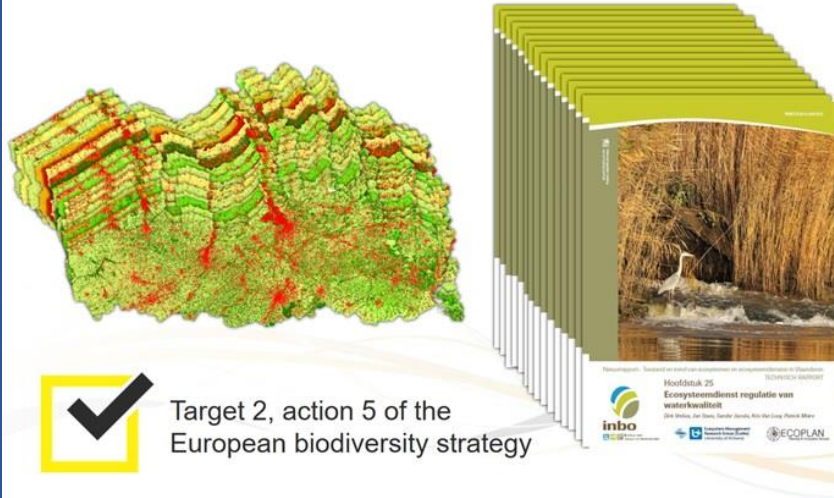


The German example

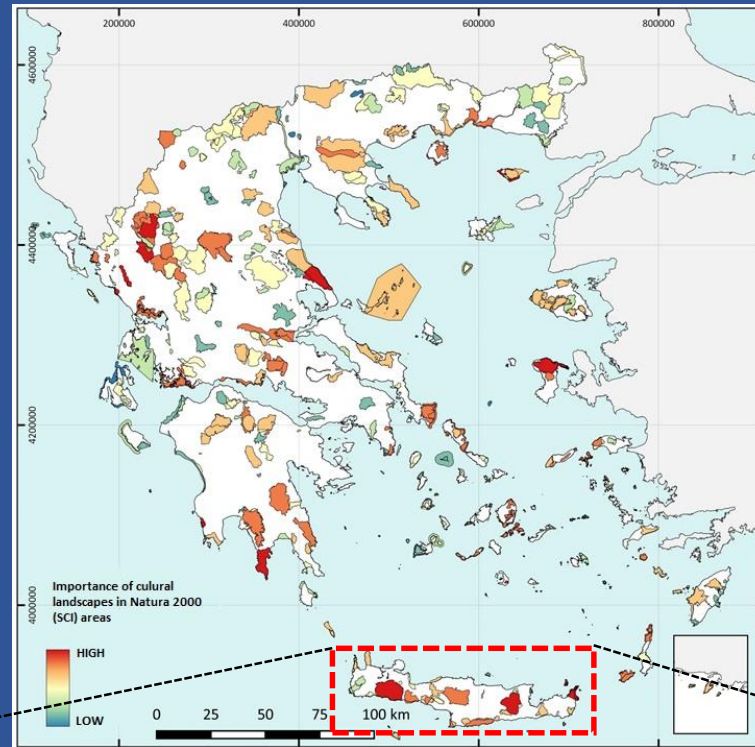
Rabe et al. 2016

Ecosystem services mapping at different scales

16 ecosystem services mapped & assessed

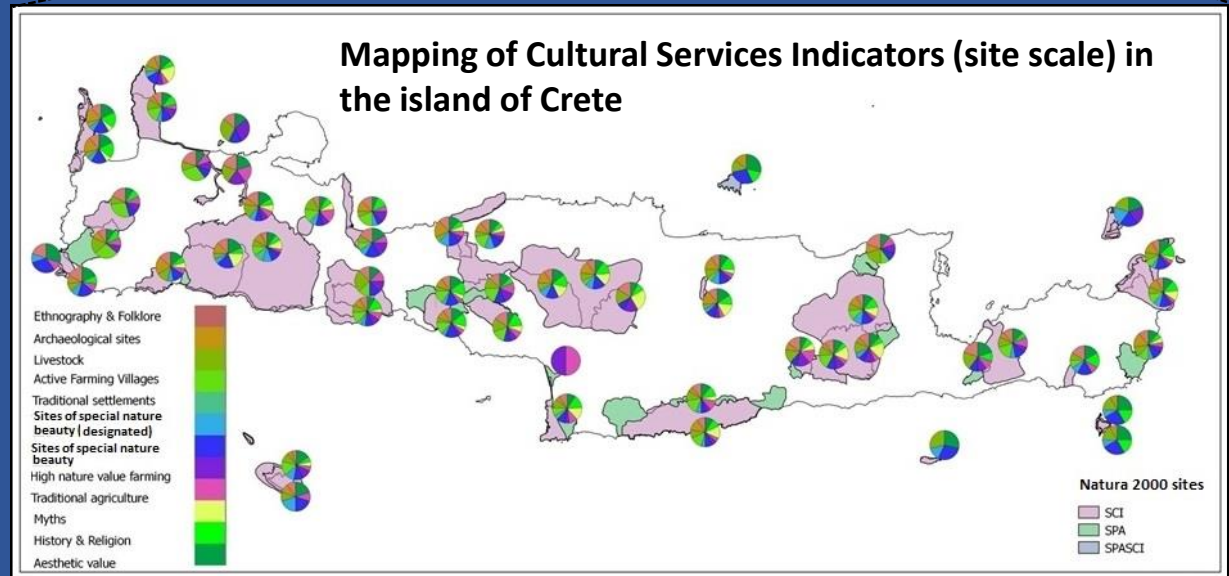


Cultural landscapes' assessment in Natura 2000 Network (GR)



The Flanders – National ES assessment

Mapping of Cultural Services Indicators (site scale) in the island of Crete





Emphasis should be given on the need to know in detail

where we have what **and** where we need what **in the EU territory**

