

# International Conference on the assessment of natural capital, ecosystem services and biodiversity

November 19-20 November, 2019, Izmailovo Tourist Hotel Complexes, Moscow, Russian Federation

Ecosystem assessment and  
accounting on European  
Level –

Approach, Results and  
Application in Policy



Dr. Jana TAFI

European Environment Agency    Courtesy to Marcus Erhard (EEA), Jan-Erick Petersen (EEA) and Jean-Louis Weber (EEA Scientific Committee)

- ✓ EEA role in EU-informing policy through science
- ✓ Policy frame for natural capital, ecosystems, ecosystem services and biodiversity assessments
- ✓ SEEA in EU: approach and results
- ✓ Ecosystem/services assessment with MAES: approach and results

# The European Environment Agency

The EEA is an EU agency that operates at the **interface of science and policy**.

The EEA provides **timely, reliable, targeted and relevant** information to support sustainable development.

The Eionet network comprises **1800 experts** from over **400 national institutions** in **39 countries**.

Located in Copenhagen and operational since 1994



<https://www.eea.europa.eu/>

European Environment Agency

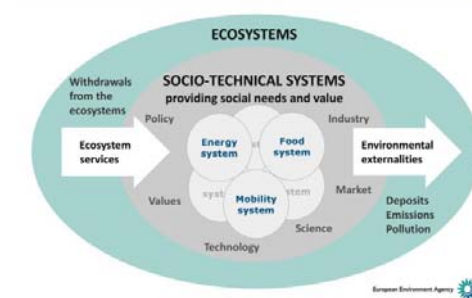


# Natural capital Accounting and Ecosystem Services in the broader context

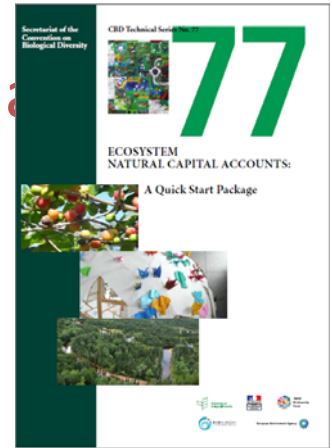
- EU Biodiversity Strategy 2020 including Green Infrastructure (TEN-G)
- LIFE Programme/Pollinators initiative
- Climate change mitigation/adaptation/LULUCF
- UN Sustainable Development Goals
- SOER 2020 systemic changes and natural capital
- Post 2020 Strategy upcoming ( CBD global-EU-national)



Green Economy: Living well within ecological limits



# Implementing of international agreements in the EEA

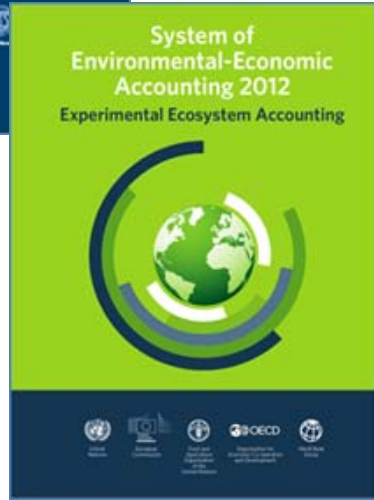
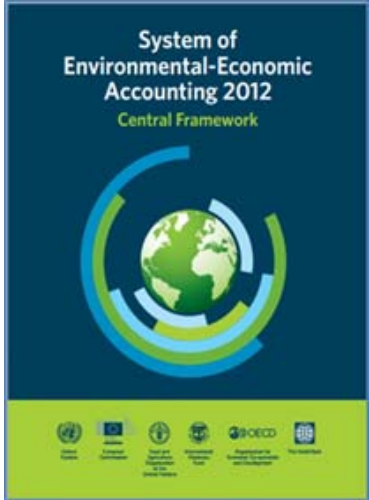
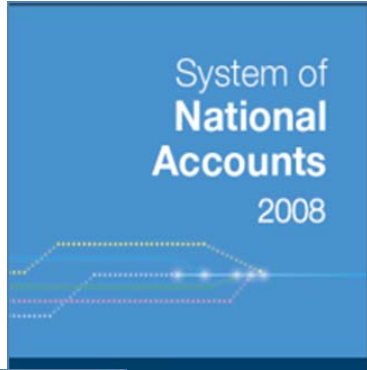


- Aichi Biodiversity Target 2 **Target 2** “ **By 2020**, at the latest, **biodiversity values** have been integrated into national and local development and poverty reduction strategies and planning processes and **are being incorporated into national accounting**, as appropriate, and reporting **systems.**”
- SDG 15.9 “By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts”.



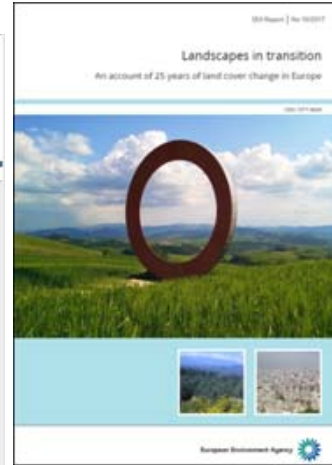
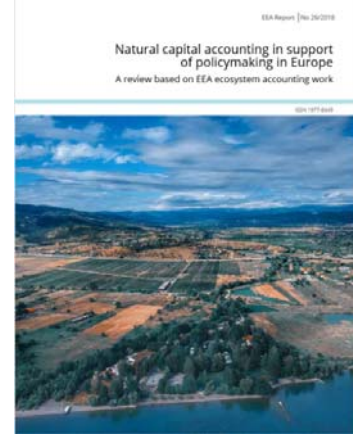
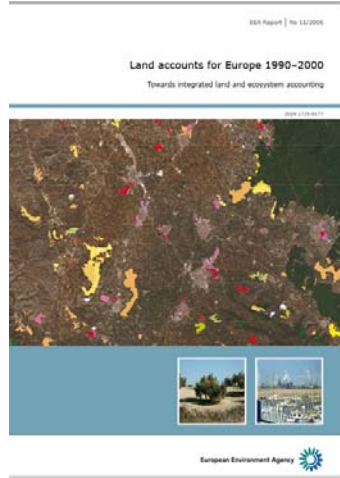
# EU and EEA contribution to the SEEA volumes 1 & 2

SNA



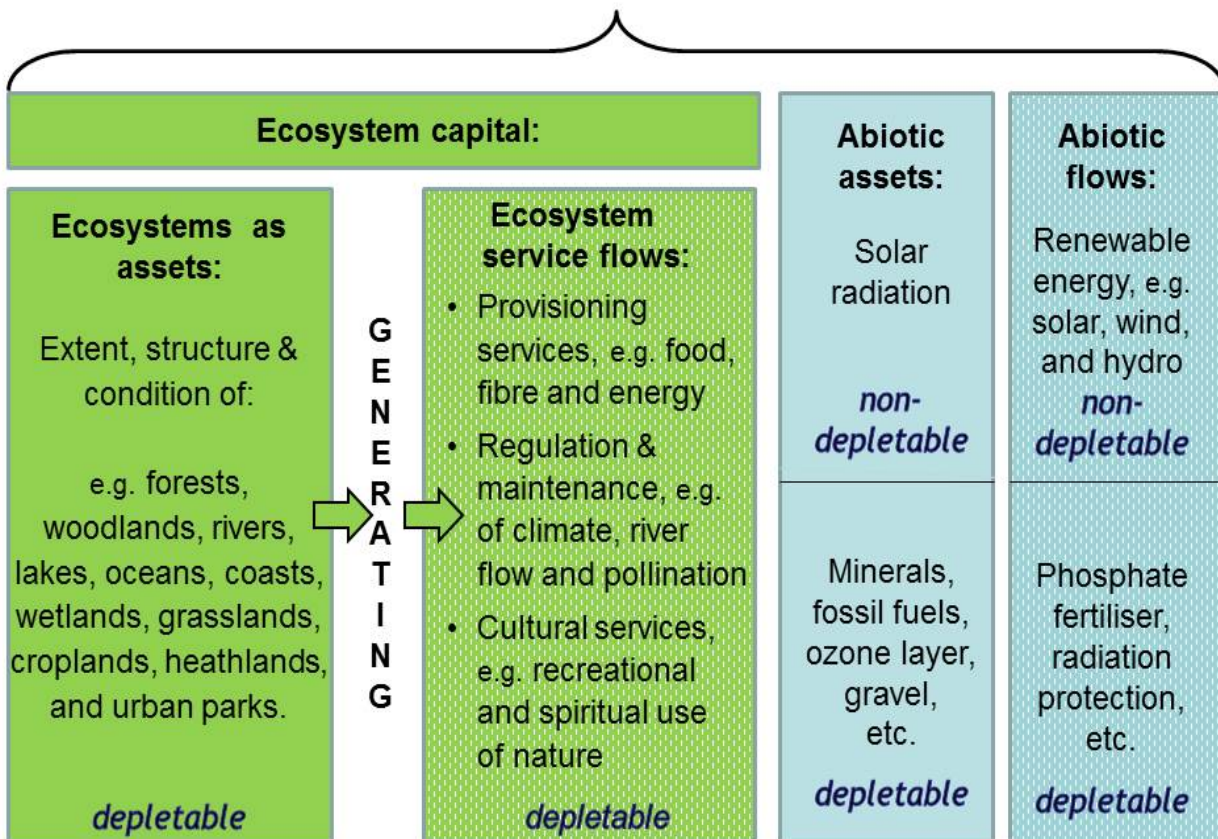
SEEA Volume 1  
"Central Framework"

SEEA Volume 2  
"Experimental Ecosystem Accounting"



# Ecosystems and their Services as Part of Natural Capital

## Natural capital

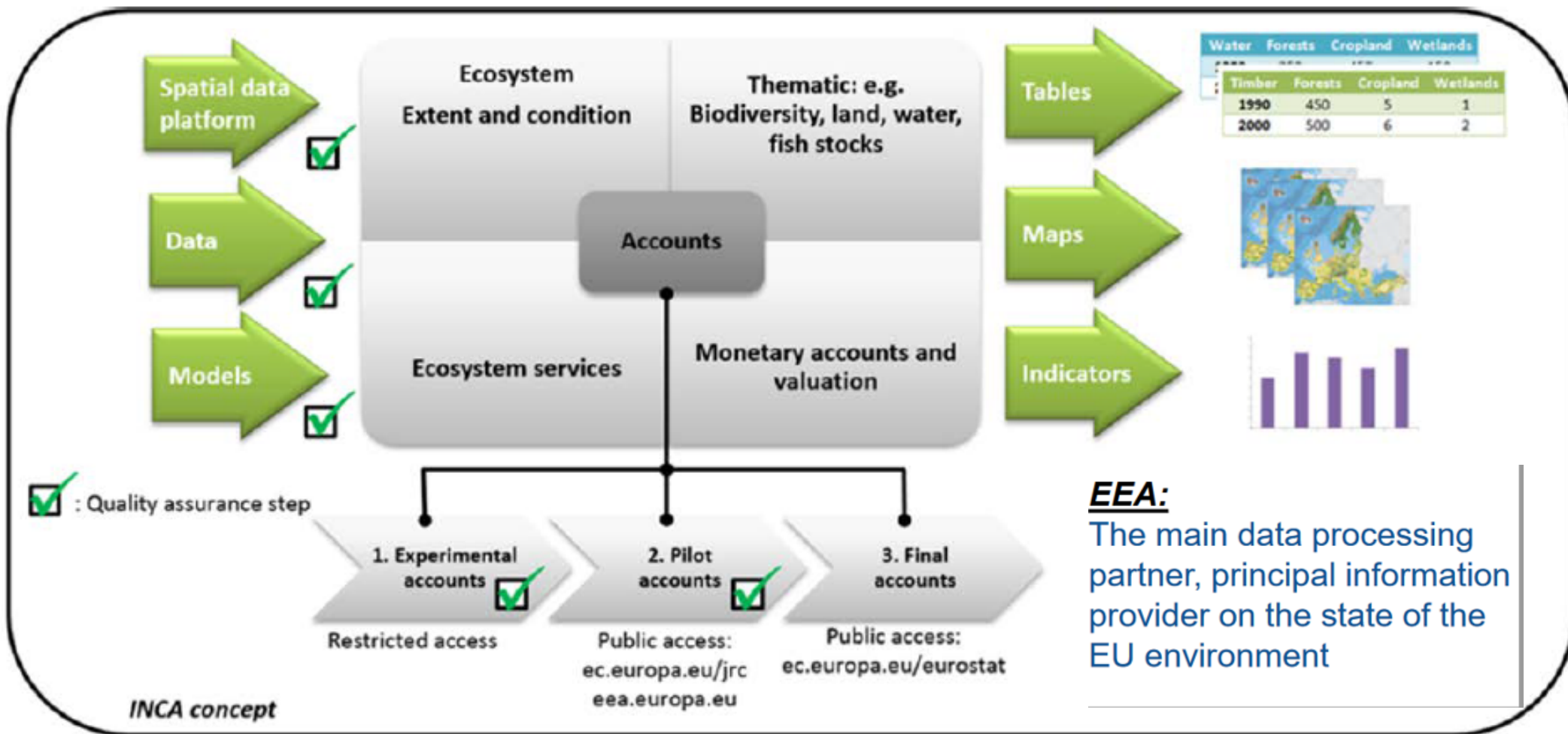


## Common International Classification of Ecosystem Services (CICES) Basic Structure and Relationship of Classes to TEEB Classification, 2011, EEA

CICES Theme	CICES Class	TEEB Categories			
Provisioning	Nutrition	Food	Water		
	Materials	Raw Materials	Genetic resources	Medicinal resources	Ornamental resources
	Energy				
Regulating and Maintenance	Regulation of wastes	Air purification	Waste treatment (esp. water purification)		
	Flow regulation	Disturbance prevention or moderation	Regulation of water flows	Erosion prevention	
	Regulation of physical environment	Climate regulation (incl. C-sequestration)	Maintaining soil fertility		
	Regulation of biotic environment	Gene pool protection	Lifecycle maintenance	Pollination	Biological control
Cultural	Symbolic	Information for cognitive development			
	Intellectual and Experiential	Aesthetic information	Inspiration for culture, art and design	Spiritual experience	Recreation & tourism

Basic Structure and Relationship of Classes to TEEB Classification

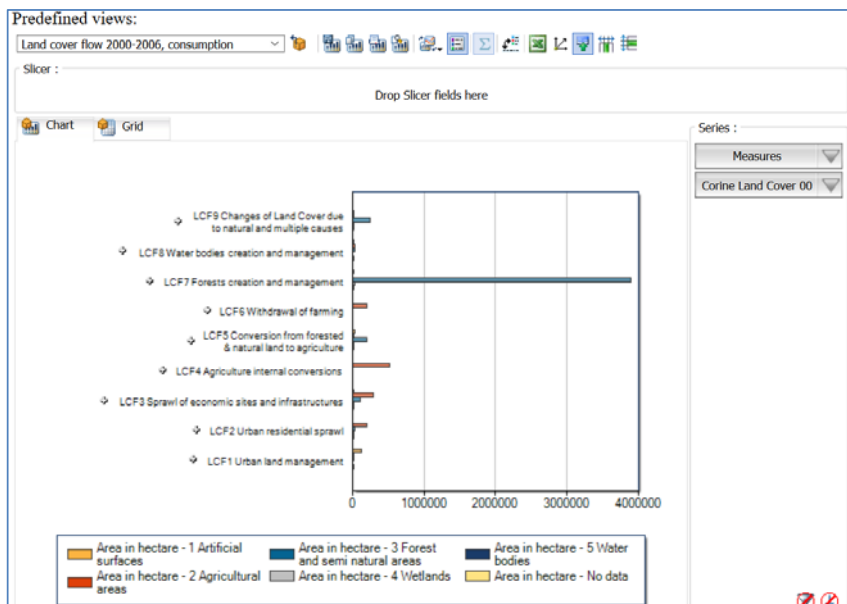
# KIP INCA : Knowledge & Information Partnership for Integrated Natural Capital Accounting in 2020





# EEA: Land Ecosystem Accounting (LEAC) Update 2018

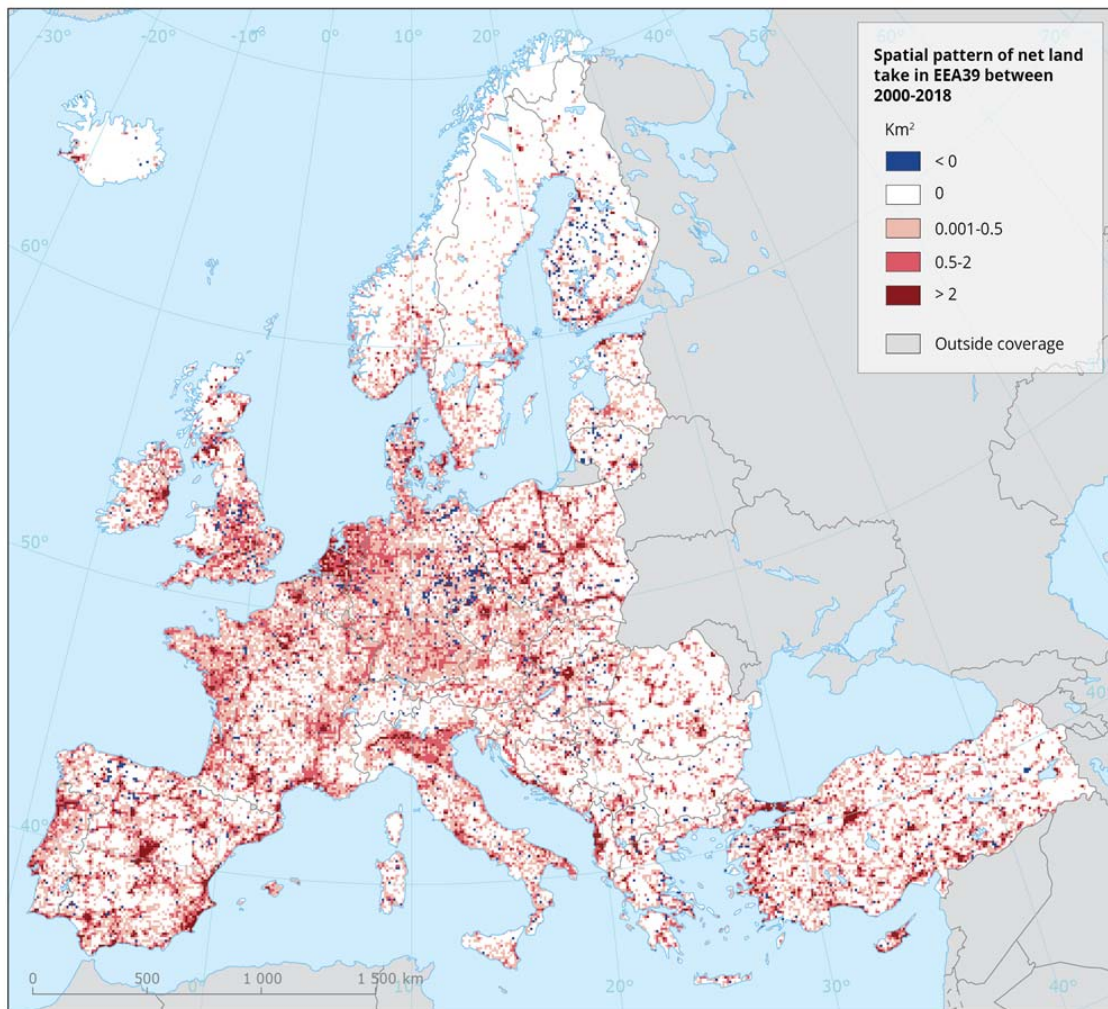
- The CORINE Land Cover (CLC) inventory was initiated in 1985 (reference year 1990) to standardize data collection on land in Europe to support environmental policy development. Updates were produced in 2000, 2006, 2012 and 2018. Change layers were produced for 2000, 2006, 2012 and 2018.
- Land accounts data viewer 1990, 2000, 2006, **update for 2012 and 2018 forthcoming**



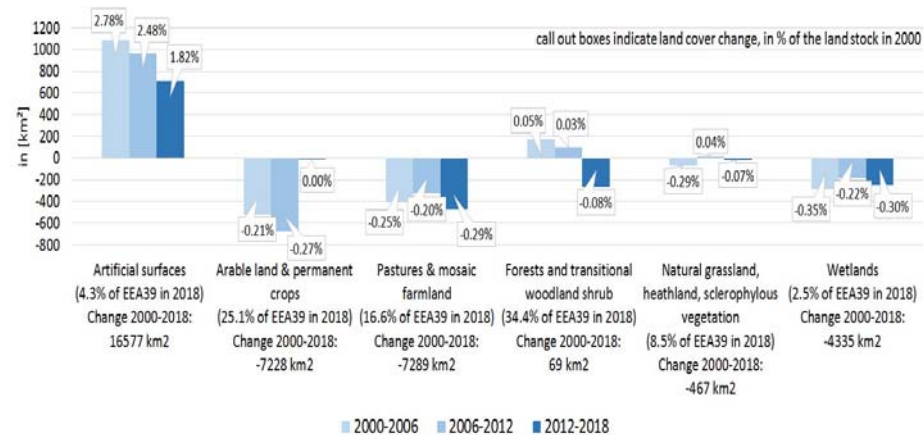
Land cover accounts 2006-2012 (km<sup>2</sup>) for the 39 EU countries

	Artificial areas	Arable land & permanent crops	Pastures & mosaics	Forested land	Semi-natural vegetation	Open spaces/ bare soils	Wetlands	Water bodies	TOTAL [hundreds ha]
<b>Land cover 2006</b>	<b>232872</b>	<b>1475722</b>	<b>987066</b>	<b>2011348</b>	<b>507477</b>	<b>346878</b>	<b>147774</b>	<b>151704</b>	<b>5860842</b>
Consumption of initial LC	2543.6	9941.7	5672.4	69775.7	2183.5	2182.3	212.5	346.3	92858
Formation of new LC	8281.5	5903.6	3708.2	70406.3	1091.4	1914.4	273.7	1278.8	92858
<b>Net Formation of LC</b>	<b>5737.9</b>	<b>-4038.1</b>	<b>-1964.2</b>	<b>630.7</b>	<b>-1092.1</b>	<b>-267.9</b>	<b>61.2</b>	<b>932.5</b>	<b>0</b>
Net formation as % of initial year	2.5	-0.3	-0.2	0.0	-0.2	-0.1	0.0	0.6	
<b>Total turnover of LC</b>	<b>10825.1</b>	<b>15845.3</b>	<b>9380.6</b>	<b>140182</b>	<b>3275.0</b>	<b>4096.7</b>	<b>486.2</b>	<b>1625.0</b>	<b>185716</b>
Total turnover as % of initial year	4.6	1.1	1.0	7.0	0.6	1.2	0.3	1.1	3.2
<b>Land cover 2012</b>	<b>238610</b>	<b>1471684</b>	<b>985102</b>	<b>2011979</b>	<b>506385</b>	<b>346610</b>	<b>147835</b>	<b>152637</b>	<b>5860842</b>

# EEA: CORINE Land cover 2000-2018 change and LEAC



- In the period 2000 to 2018, average annual land take was 734 km<sup>2</sup> in the EU-28.
- If this trend continues, the EU could be on-track to reach its 2020 target.

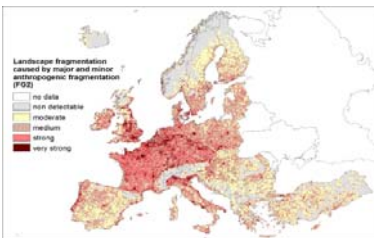


# Mapping - Assessment - Accounting

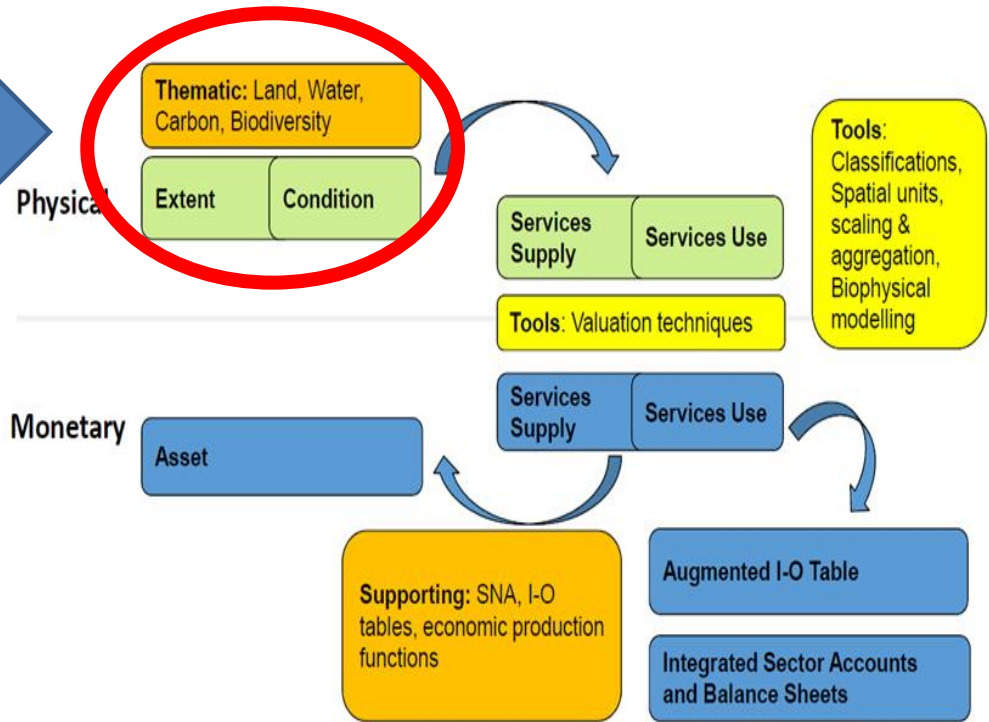
## Ecosystem Assessment and GI



### Spatial data



## Accounting



(1) Major ecosystems

Urban Cropland Grassland Woodland and forest Heathland and shrub Sparsely vegetated land Wetlands Rivers and lakes Marine inlets and transitional waters Coastal Shelf Open ocean	Land use land cover data, e.g. Corine Land Cover Copernicus high resolution data Elevation data Seabed maps National datasets
	Models for spatially delineating wetlands or natural, unmanaged systems

(2) Assess the condition of ecosystems		(3) Assess the ecosystem services delivered by ecosystems	
Indicators	Data	Indicators	Data and models
Conservation status of habitats and species	Art.17 assessment	Supply indicators: Indicators of stock and flow of ecosystem functions and ecosystem services	Different sources of environmental data and models
Ecological status of water bodies	WFD assessment		
Environmental status of seas	MSFD assessment		
Ecosystem status and biodiversity	data including air pollutant concentration, habitat connectivity, land use change, soil degradation, ...	Demand indicators: Indicators for the human demand for ecosystem services	Different socio-economic statistics

(4) Integrated ecosystem assessment:  
How does condition relate to services provision?  
How do the various ecosystem types interact to provide services?



# Mapping and Assessment on Ecosystems and their Services (MAES): Ecosystem assessment

(1)  
Map ecosystems

Urban Cropland Grassland Woodland and forest Heathland and shrub Sparsely vegetated land Wetlands Rivers and lakes Marine inlets and transitional waters Coastal Shelf Open ocean	Land use land cover data, e.g. Corine Land Cover Copernicus high resolution data Elevation data Seabed maps National datasets  Models for spatially delineating wetlands or natural, unmanaged systems
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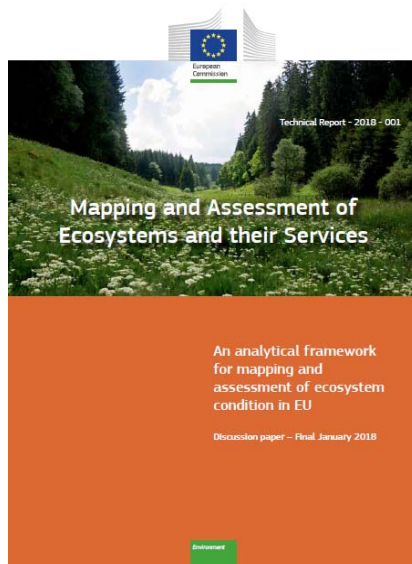
(2)  
Assess the condition of ecosystems

Indicators	Data
Conservation status of habitats and species	Art.17 assessment
Ecological status of water bodies	WFD assessment
Environmental status of seas	MSFD assessment
Ecosystem status and biodiversity	data including air pollutant concentration, habitat connectivity, land use change, soil degradation, ...

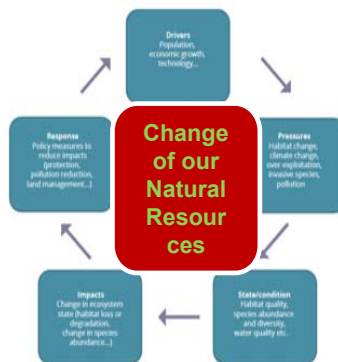
(3)  
Assess ecosystem services delivered by ecosystems

Indicators	Data and models
Supply indicators: Indicators of stock and flow of ecosystem functions and ecosystem services	Different sources of environmental data and models
Demand indicators: Indicators for the human demand for ecosystem services	Different socio-economic statistics

(4)  
Integrated ecosystem assessment:  
How does condition relate to services provision?  
How do the various ecosystem types interact to provide services?



## DPSIR approach



## Common Analytical Assessment Framework:

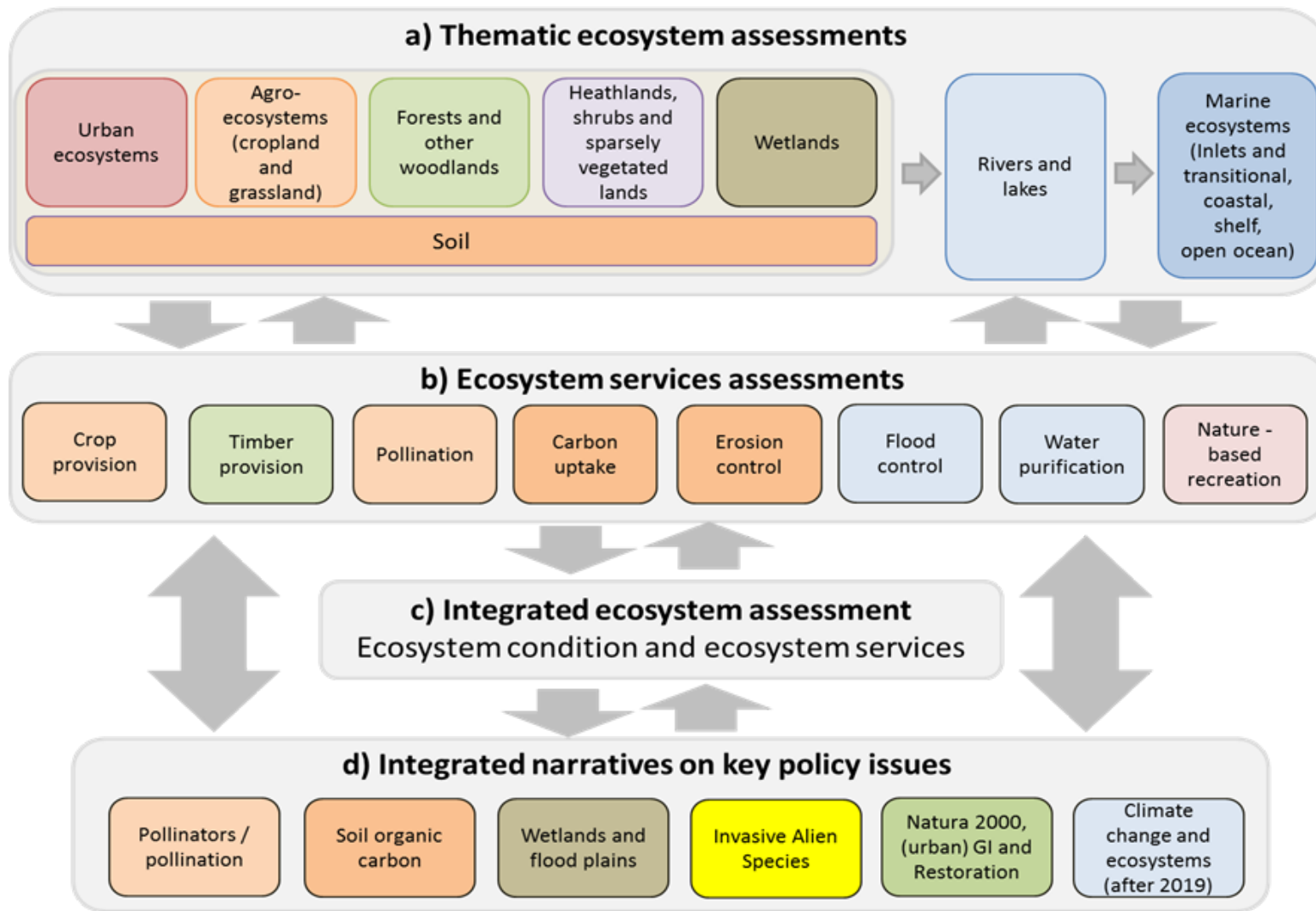
- Building blocks for an integrated assessment
- ✓ Improving the knowledge base
- uptake of new information, interpretation, integration;
- ✓ Mapping and assessing ecosystems and their services
- ecosystem mapping, condition assessment, service modelling;
- ✓ Linking ecosystem conditions and ecosystem services
- sensitivity of service assessments to condition changes
- ✓ Providing input and using accounting and valuation
- ecosystem extent, condition, services



<https://biodiversity.europa.eu/maes>



# MAES assessments: Data and Indicator



**MAES Conference**  
**13. Dec. 2019**  
**Helsinki**  
**5<sup>th</sup> MAES report**

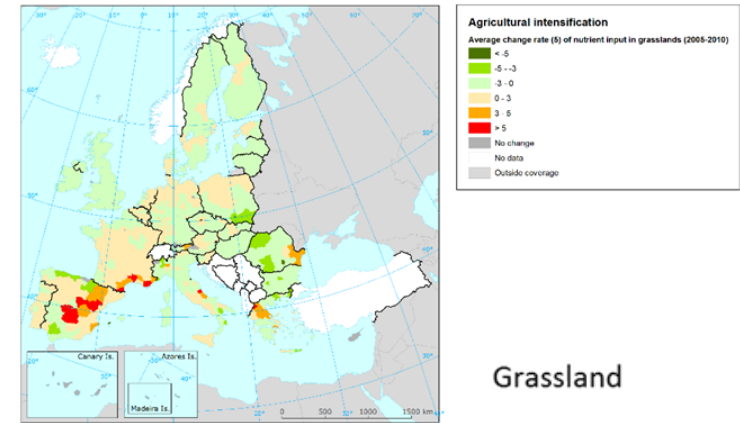
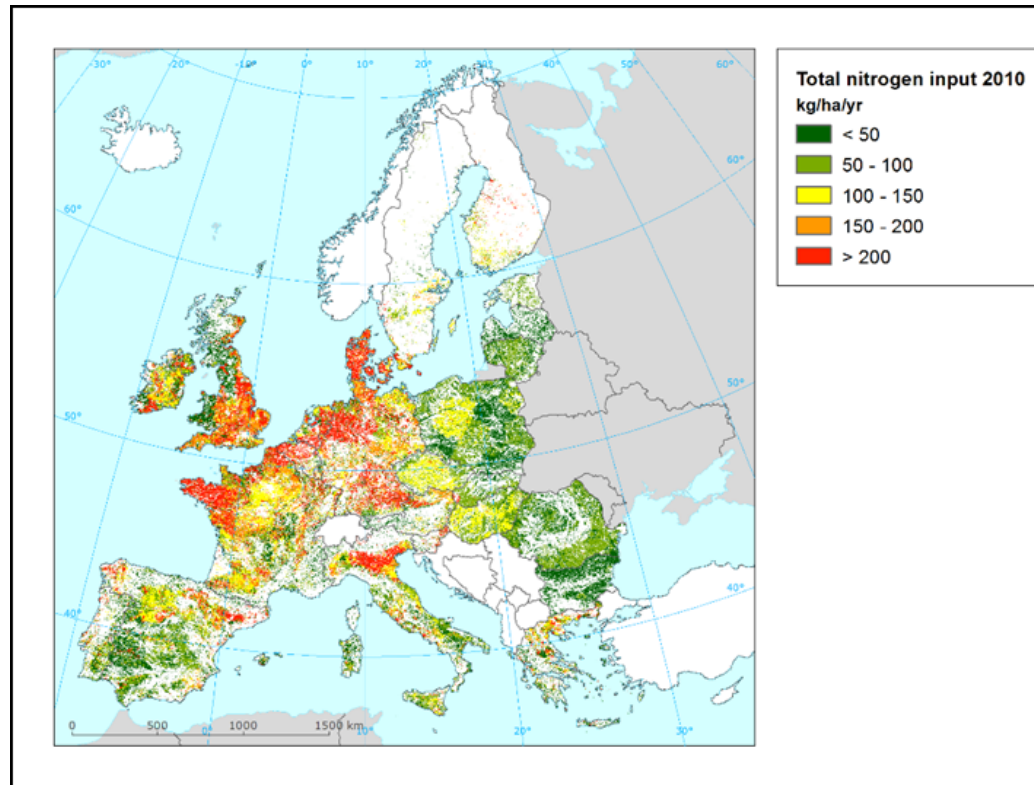
<https://data.jrc.ec.europa.eu/collection/maes>

**Scoping paper**  
**Available**  
**End of 2020**

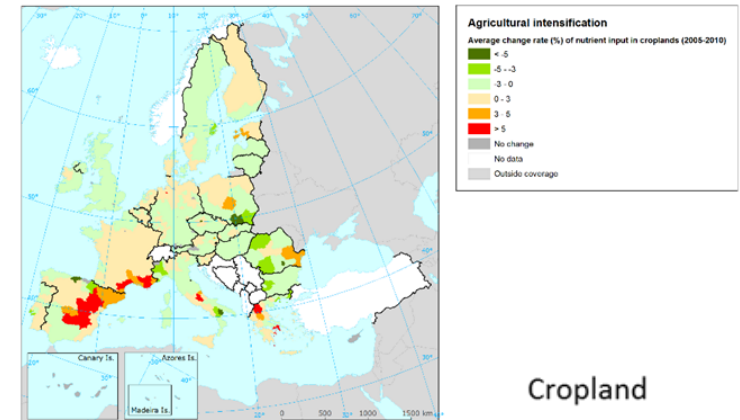


# Mapping the Pressures – Nitrogen Load

## Total nitrogen input to cropland and grassland 2010 and change over time



Grassland



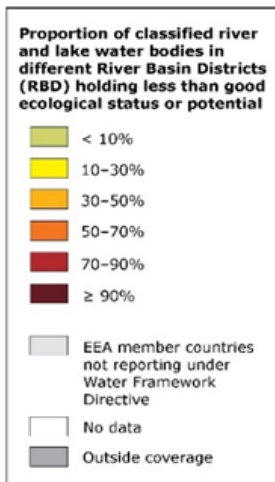
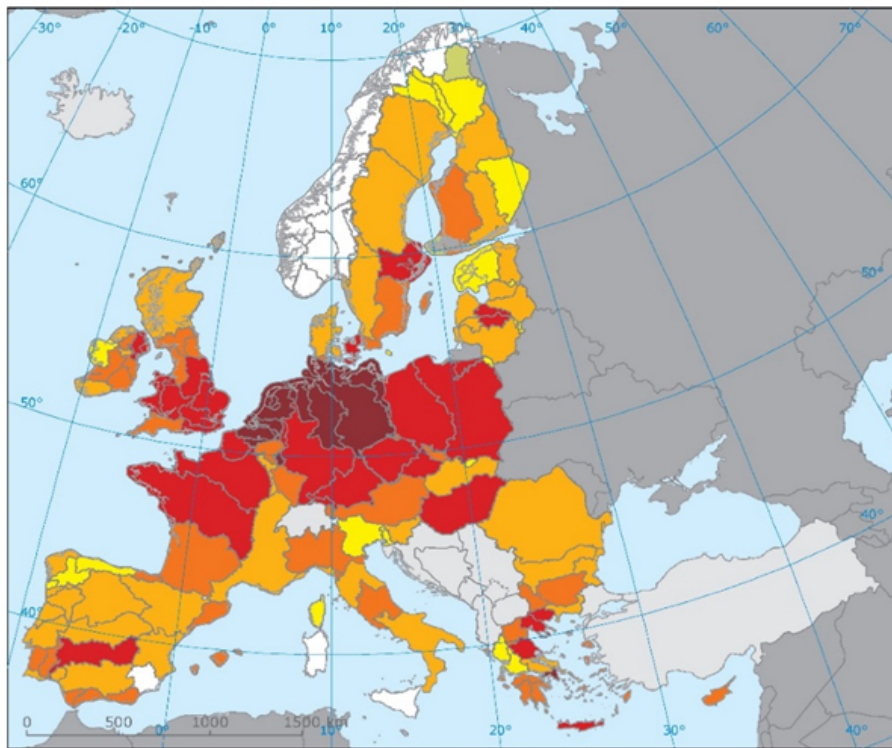
Cropland

- Atmospheric deposition
- Fertilizer / Manure
- Biological N-fixation

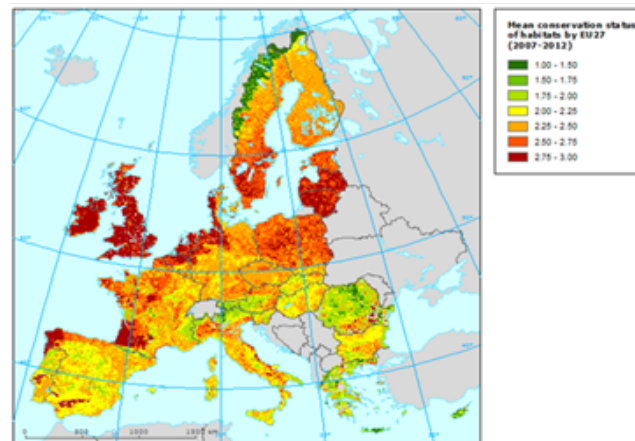


# Mapping the Ecosystem Conditions – Environmental Directives

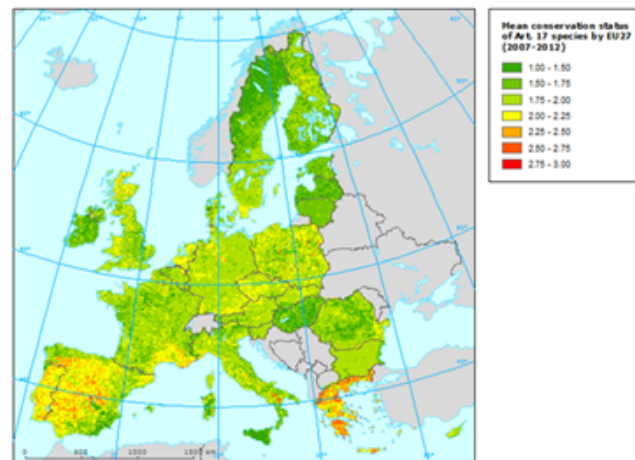
## WFD Good Ecological Status



## Habitats Directive - Habitats

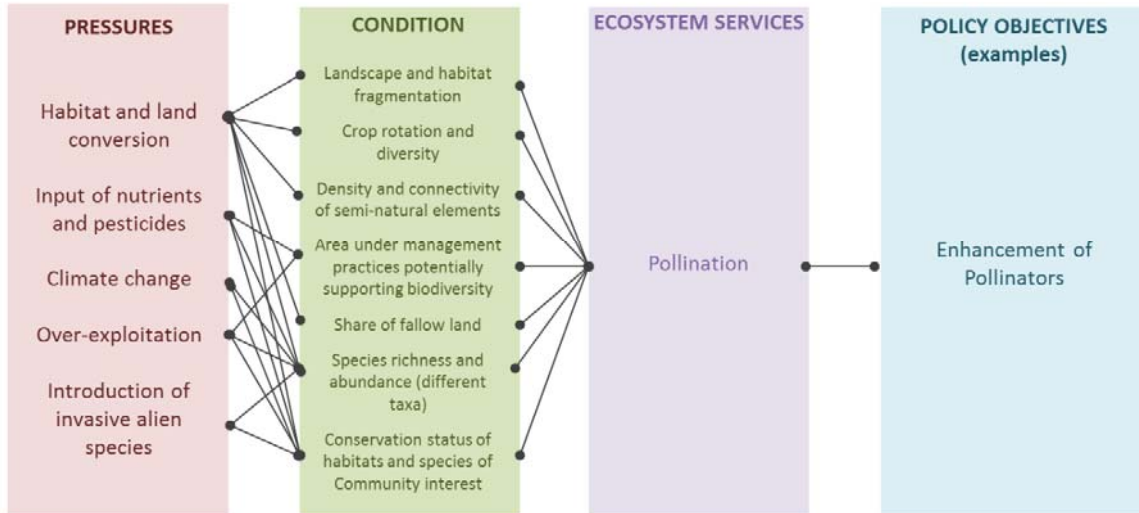


## Habitats Directive - Species

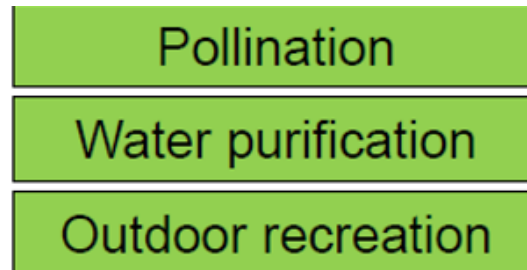


# MAES and the SEEA EEA: Connection of ES to Ecosystem Condition

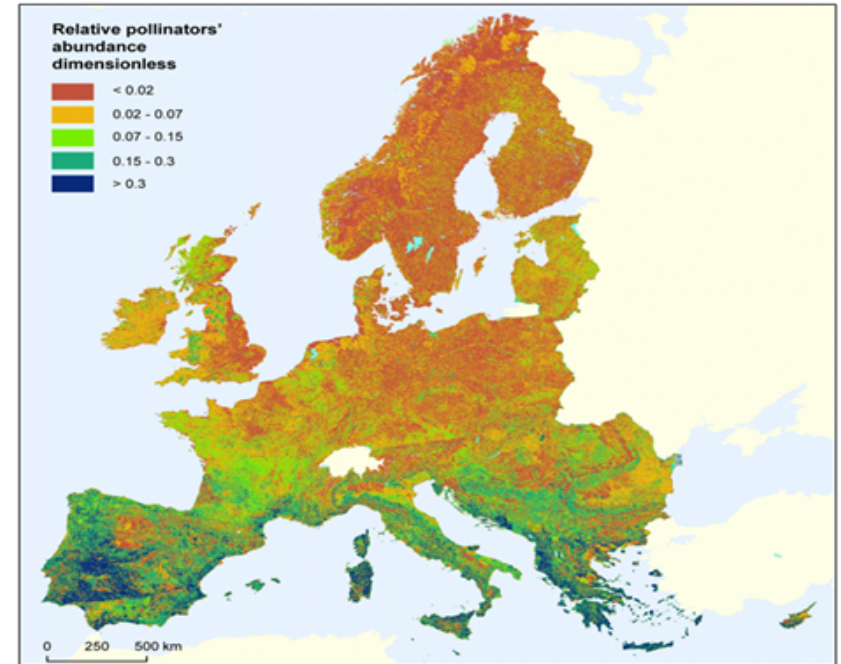
Mapping and Assessment of Ecosystems and their Services



**Figure 4.2b** Extraction of the nodes of Figure 4.2a to illustrate the example on how to enhance pollinators.



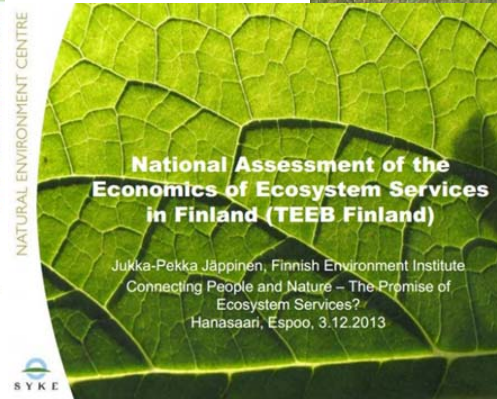
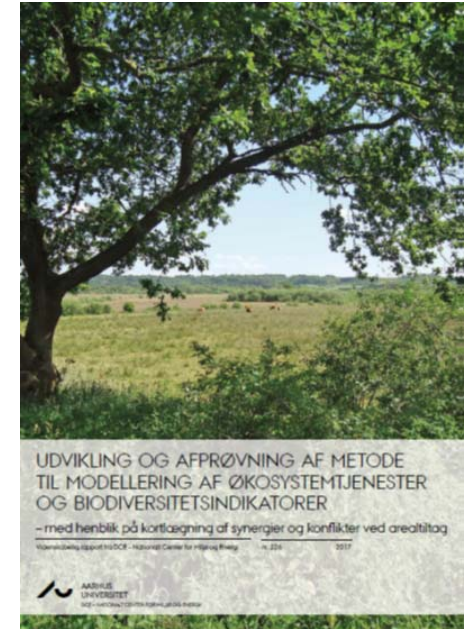
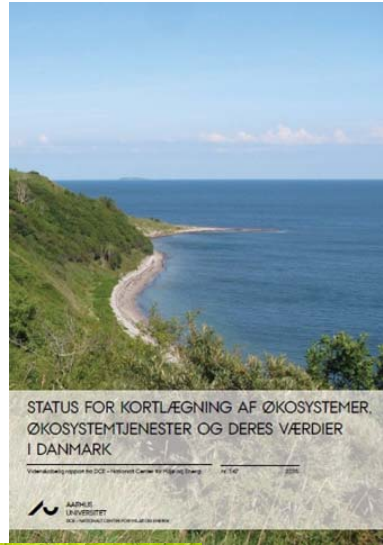
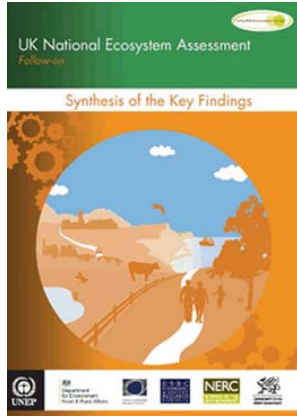
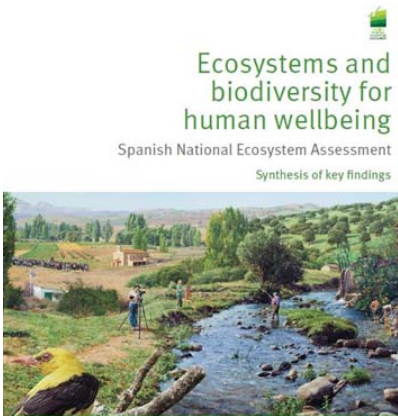
Source: MAES Report 2017



Source: J. Maes, JRC, 2014



# MAES/ ESMERALDA Ecosystem / Ecosystem Service Assessments in EU Member States



<http://biodiversity.europa.eu/countries>  
[http://esmeralda-project.eu/news/13664\\_esmeralda-country-factsheets-now-available-on-bise/](http://esmeralda-project.eu/news/13664_esmeralda-country-factsheets-now-available-on-bise/)  
<http://biodiversity.europa.eu/ecosystem-assessments>

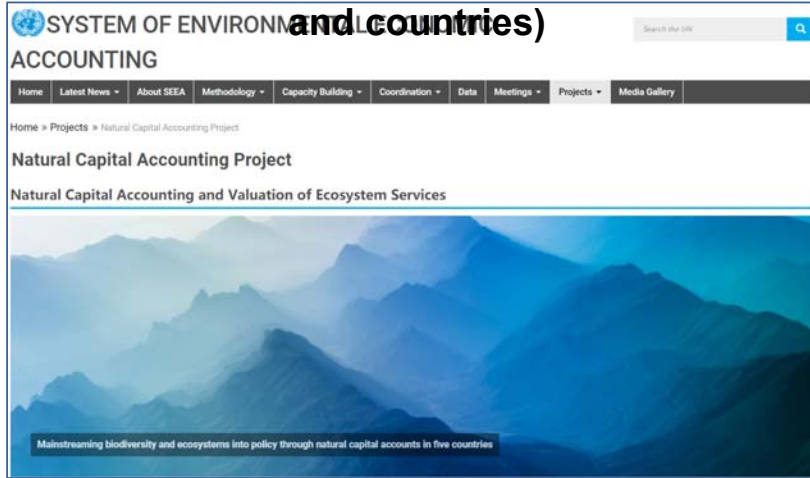
<http://www.esmeralda-project.eu/>



MAES in 28 EU countries

# Out of the EU: projects funded by the European Union

## NCA&VES project, Brazil, China, India, Mexico and South Africa, 2018 (by UNSD with UNEP, CBD and countries)



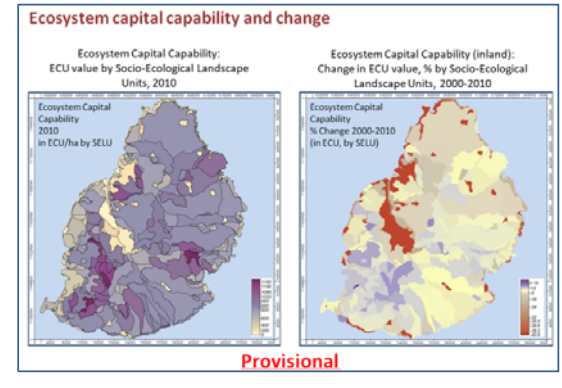
“The United Nations Statistics Division, the United Nations Environment Programme, the Secretariat of the Convention on Biological Diversity, and the European Union have launched the project “**Natural Capital Accounting and Valuation of Ecosystem Services**” (NCAVES). ... to assist the five participating partner countries, namely Brazil, China, India, Mexico and South Africa, to advance the knowledge agenda on environmental-economic accounting, in particular ecosystem accounting.”



## WAVES, the World Bank's Global Partnership on Wealth Accounting and the Valuation of Ecosystem Services (E.C. contribution to the multi-c Trust



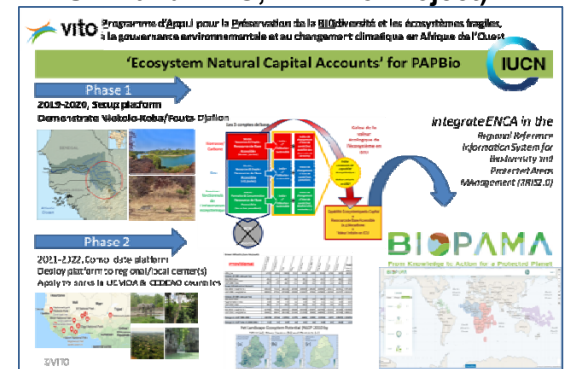
## Experimental SEEA/ENCA in Mauritius, 2014 by the Indian Ocean Commission and Statistics Mauritius, ISLANDS project)



## SEEA/ENCA on the Guyana Shield, 2019 (by WWF and ONFI, ECOSEO project)



## SEEA/ENCA for Niokolo-Koba natural park and Fouta Djallon (Western Africa), 2019 (by IUCN and VITO, PABBio Project)



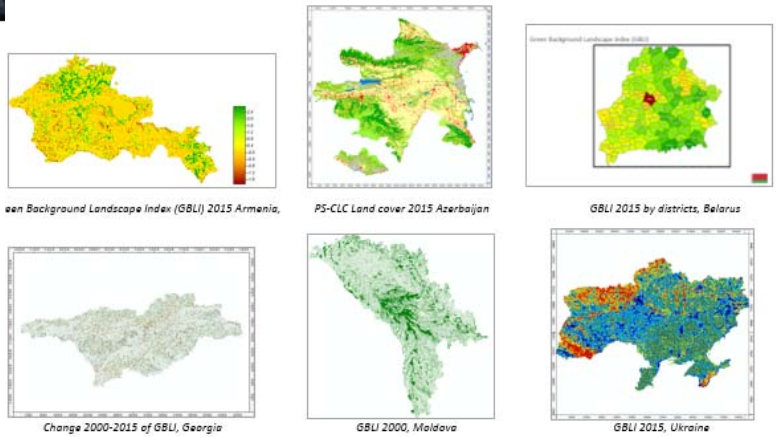


# SEEA with ecosystem approach in EaP at CIRAD, France/Eionet, 2017/2019



18 experts from environmental and statistical authorities from the 6 eastern countries trained on SEEA land with national data sets from Copernicus,...

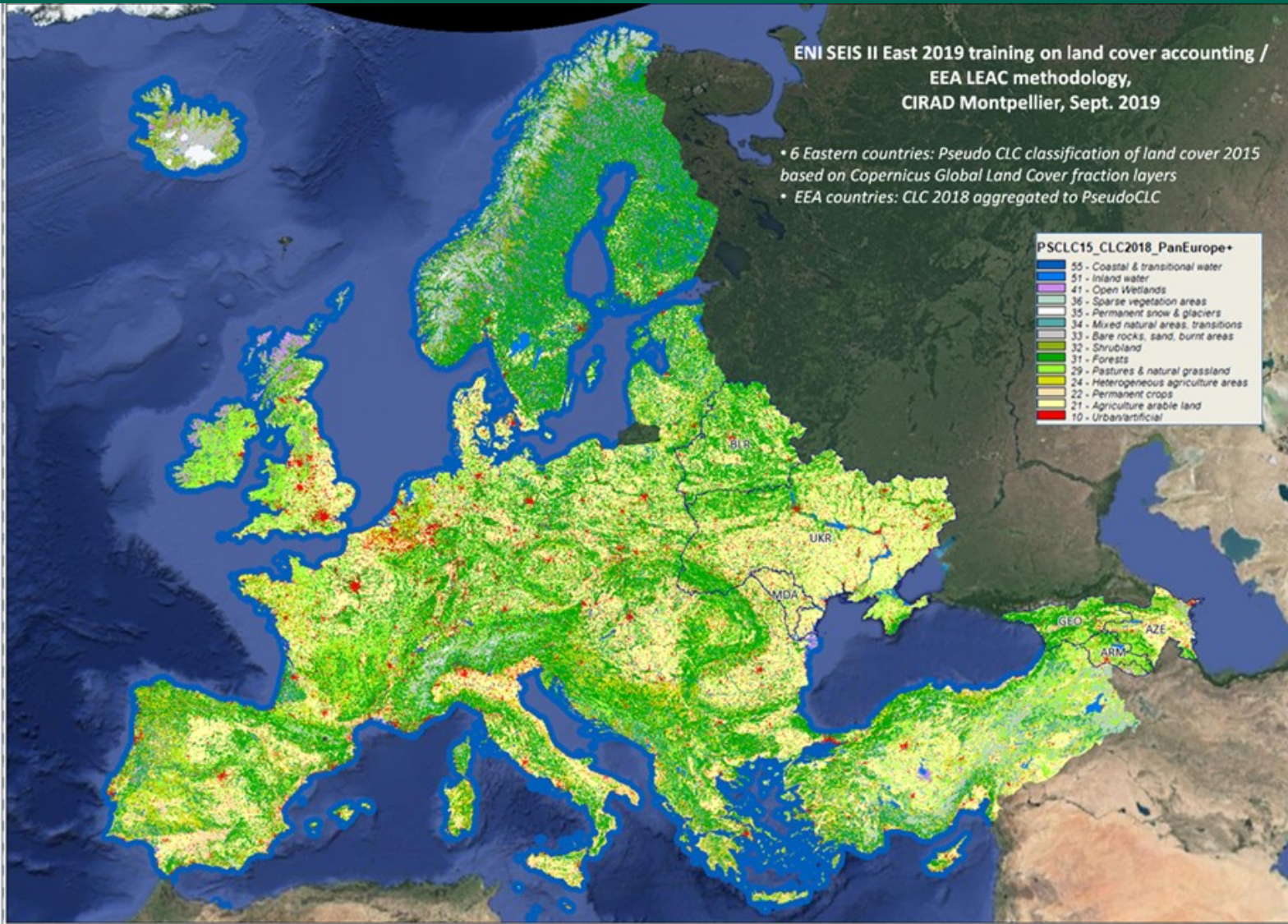
## Production land cover and land cover change accounts, 2015 -2000, EEA LEAC/ SEEA approach



Analysis of stress factors that caused of urban sprawl (SDG Indicator 11.3.1), agriculture extension (SDG Indicator 2.4.1.), deforestation (SDG Indicator 15.1.1., SDG Indicator 15.1.2.) and land uptake and production of various thematic maps derived from land cover accounts.



# Спасибо за ваше внимание !



Thank you!

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