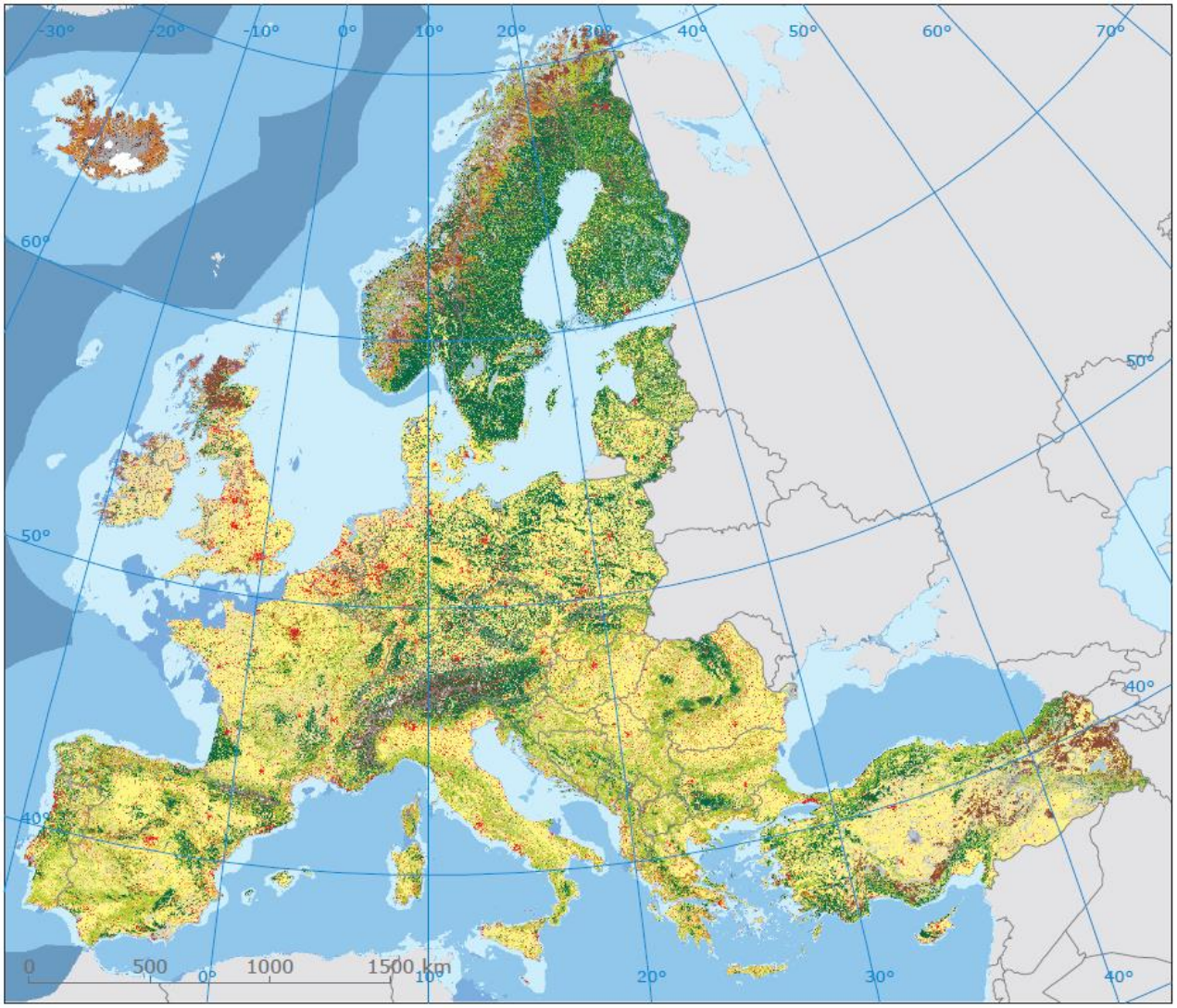
Ecosystem extent account - EU



Ecosystem map (aggregated)

Marine waters
- European regional seas
- Open waters

Marine seabed and coastal habitats
- Sublittoral sediment
- Infralittoral and circalittoral rock and other hard substrata
- Marine habitats
- Coastal habitats

Inland surface waters
- Inland waters and shores

Inland vegetation and habitats
- Tundra
- Arctic, alpine and subalpine scrub and grassland
- Mediterranean-mountain scrub and brushes
- Heathland scrub
- Grasslands and land dominated by forbs
- Regularly or recently cultivated agricultural, horticultural and domestic habitats
- Sparsely wooded grasslands
- Broad leaved deciduous and evergreen woodland
- Mixed deciduous and coniferous woodland
- Coniferous and broad leaved evergreen woodland
- Mires, bogs and fens

Inland unvegetated or sparsely vegetated habitats
- Screes, inland cliffs
- Snow or ice-dominated habitats
- Miscellaneous inland habitats with very sparse or no vegeation

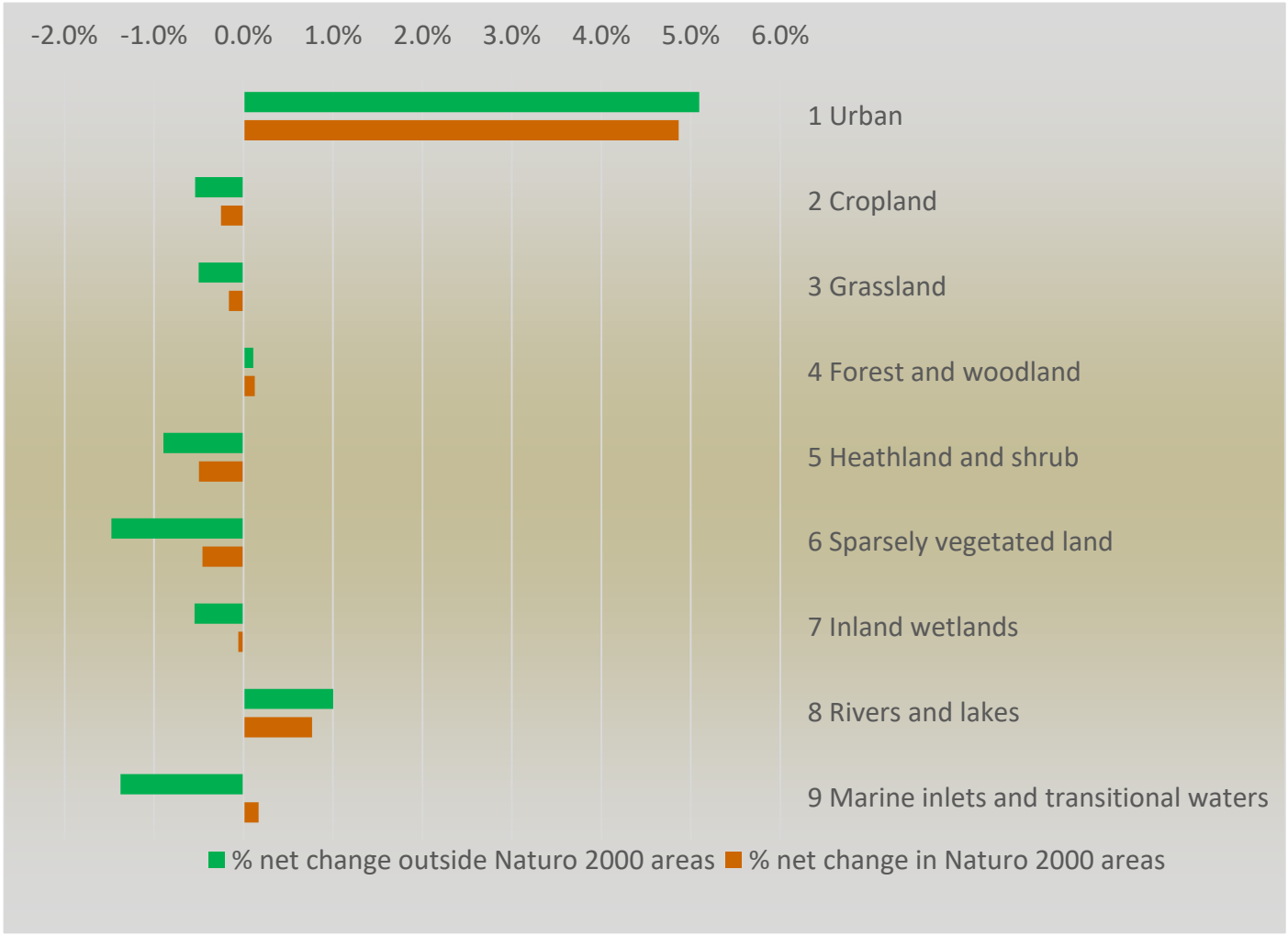
Human made constructions and habitats
- Constructed, industrial and other artificial habitats

Non classified areas
- Unclassified areas
- Outside area of interest

Source: EEA, 2015a, *European ecosystem assessment: Concept, data, and implementation,* EEA Technical Report No 6/2015, European Environment Agency

- RESULTS –

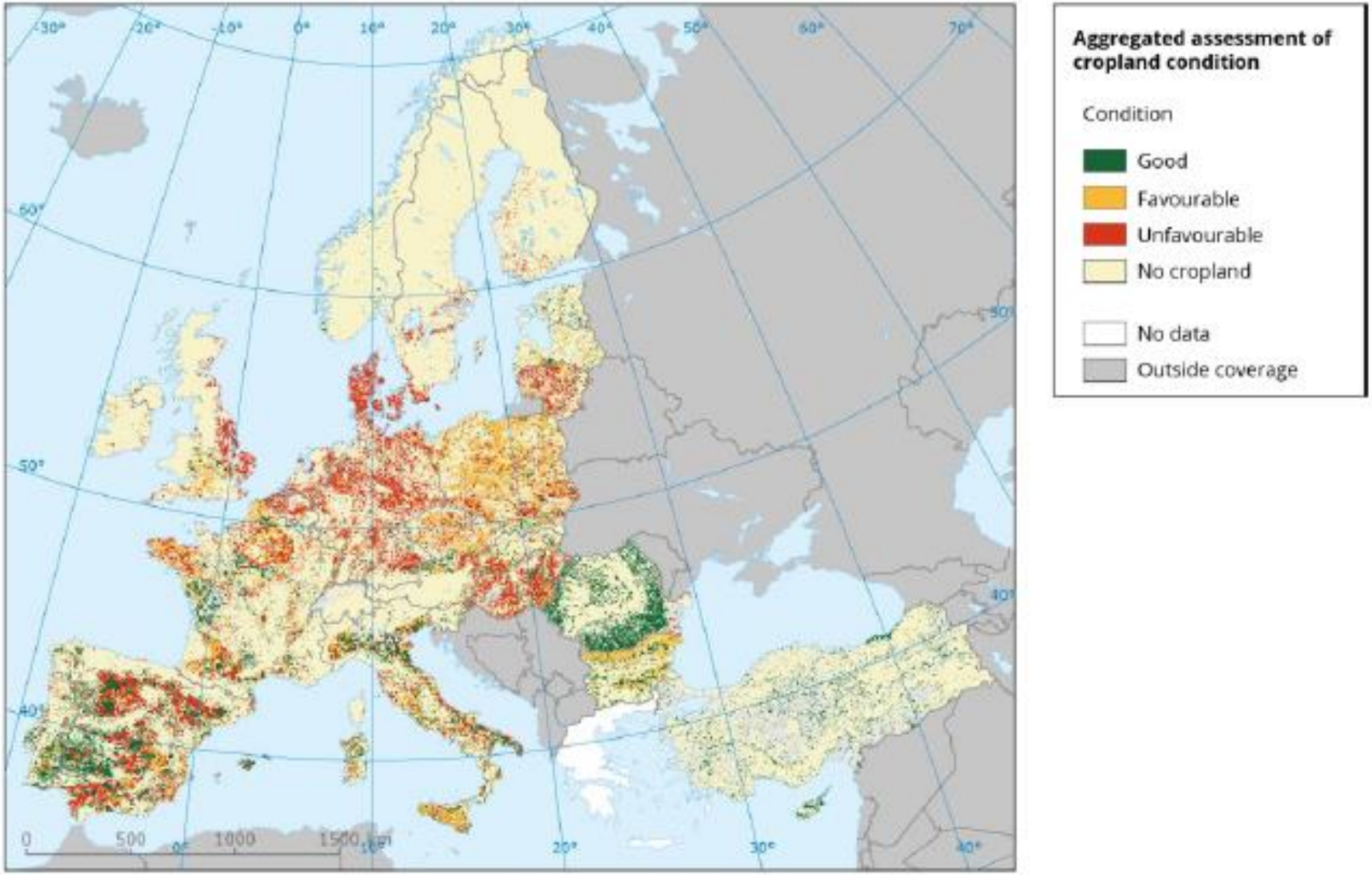
EEA: Net changes in ecosystem extent inside and outside of Natura 2000 (=protected) areas, 2000-2012



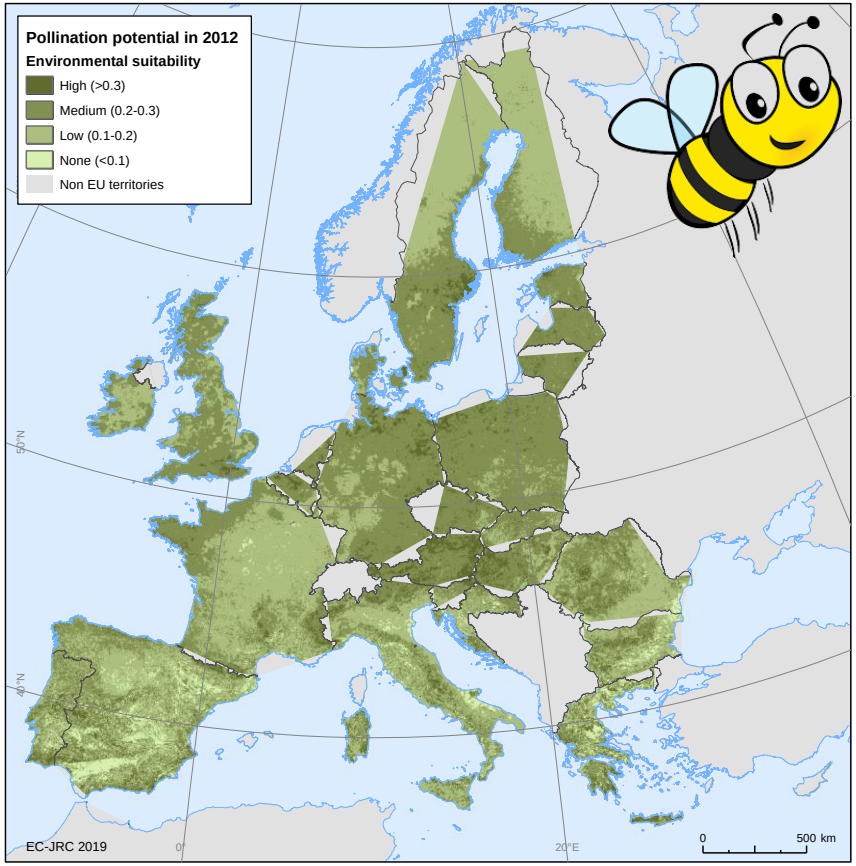
Source: EEA, CLC accounting layers 2000, 2006, 2012.

EEA May 2019: https://www.eea.europa.eu/publications/natural-capital-accounting-in-support/

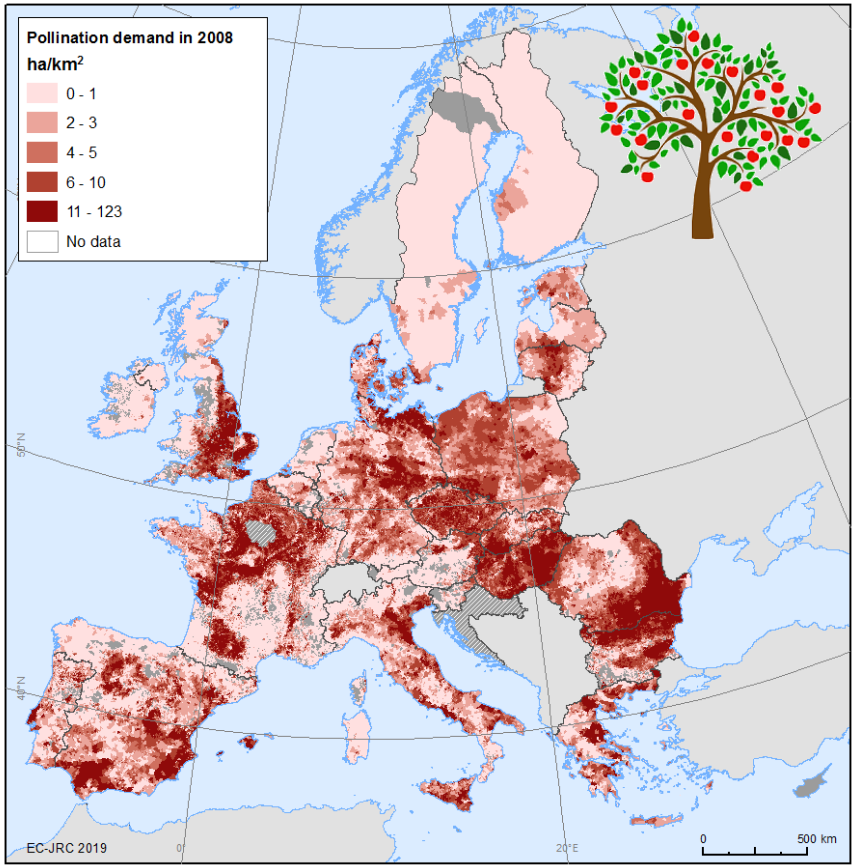
Ecosystem condition account - EU



Assessing ES
Crop pollination



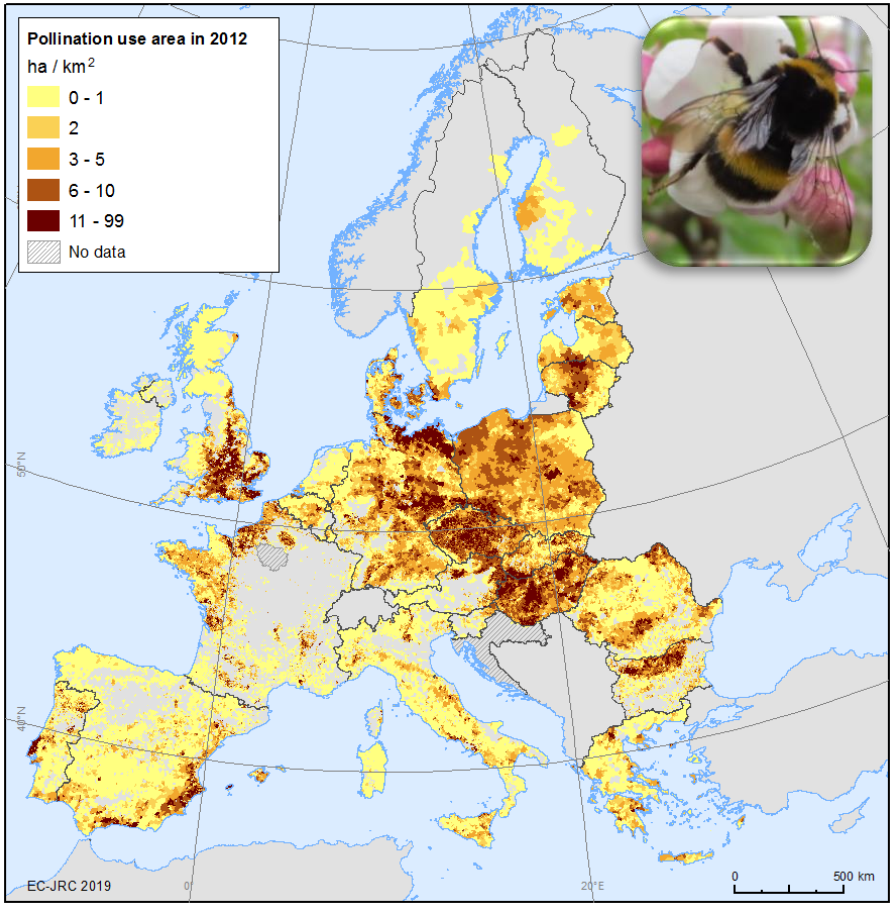
Pollination potential



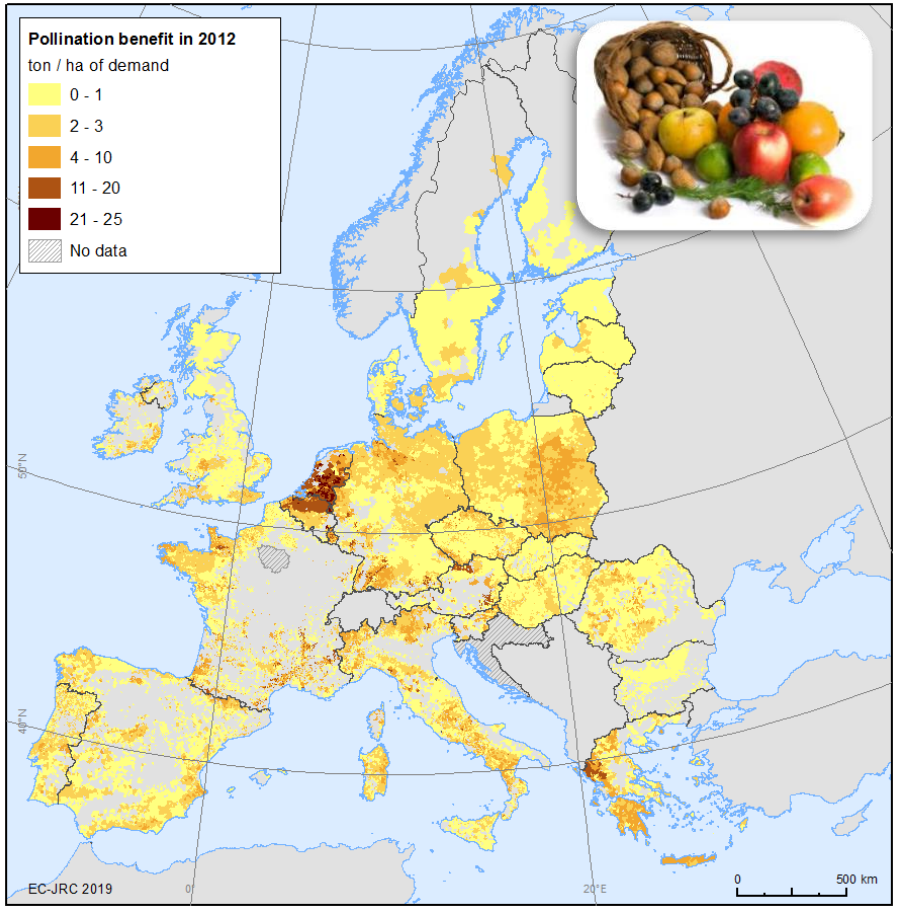
Pollination demand

European Commission

Crop pollination

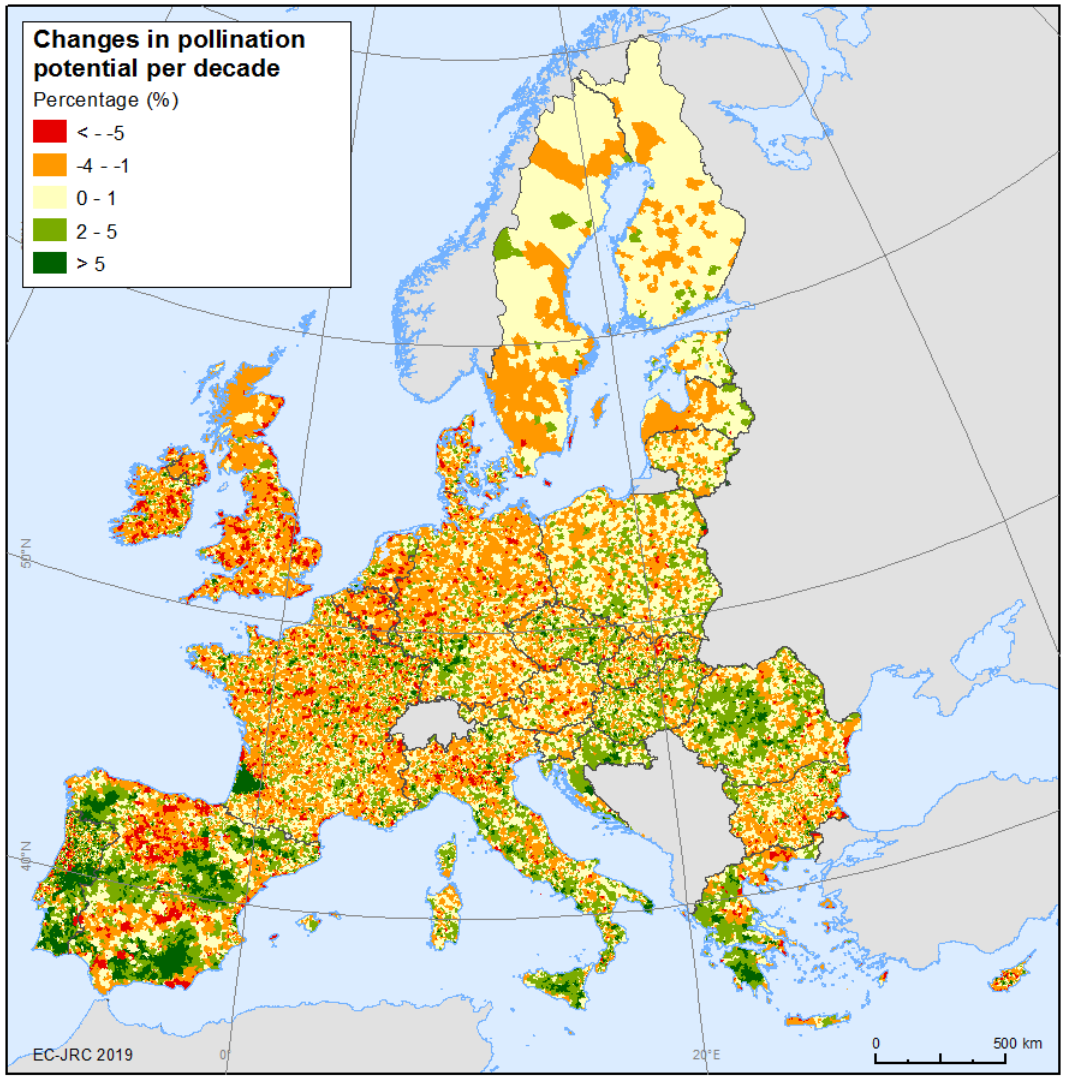


Use area (overlap)



Benefit: yield attributable to wild insect pollinators

Crop pollination

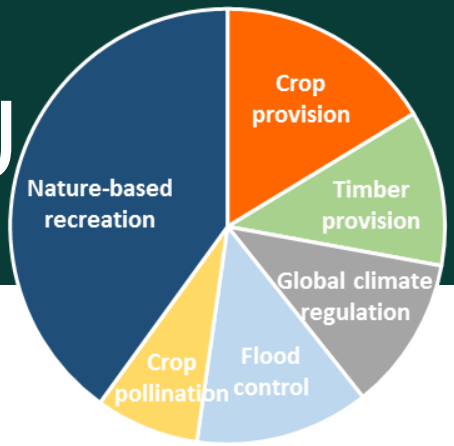


Useful for the integrated narratives

IPBES: “decline of wild pollinators in North West Europe”

European Commission

Supply table for the EU



Year 2012, million EUR	Ecosystem type									Total
Ecosystem service	Urban	Cropland	Grassland	Heathland and shrub	Woodland and forest	Sparsely vegetated land	Wetlands	Rivers and lakes	Coastal and intertidal areas	
Crop provision		20,560								20,560
Timber provision					14,540					14,540
Global climate regulation	20	150	850	20	13,330	20	0	NA	NA	14,390
Flood control	90	1,020	3,130	360	11,390	0	330	NA	NA	16,320
Crop pollination		9,720								9,720
Nature-based recreation	80	4,070	7,480	3,100	30,720	1,350	2,300	1,020	280	50,400
Total	190	35,520	11,460	3,480	69,980	1,370	2,630	1,020	280	125,930
Value in EUR/km^2	880	22,090	22,610	19,250	44,010	23,410	26,890	9,320	14,530	28,740

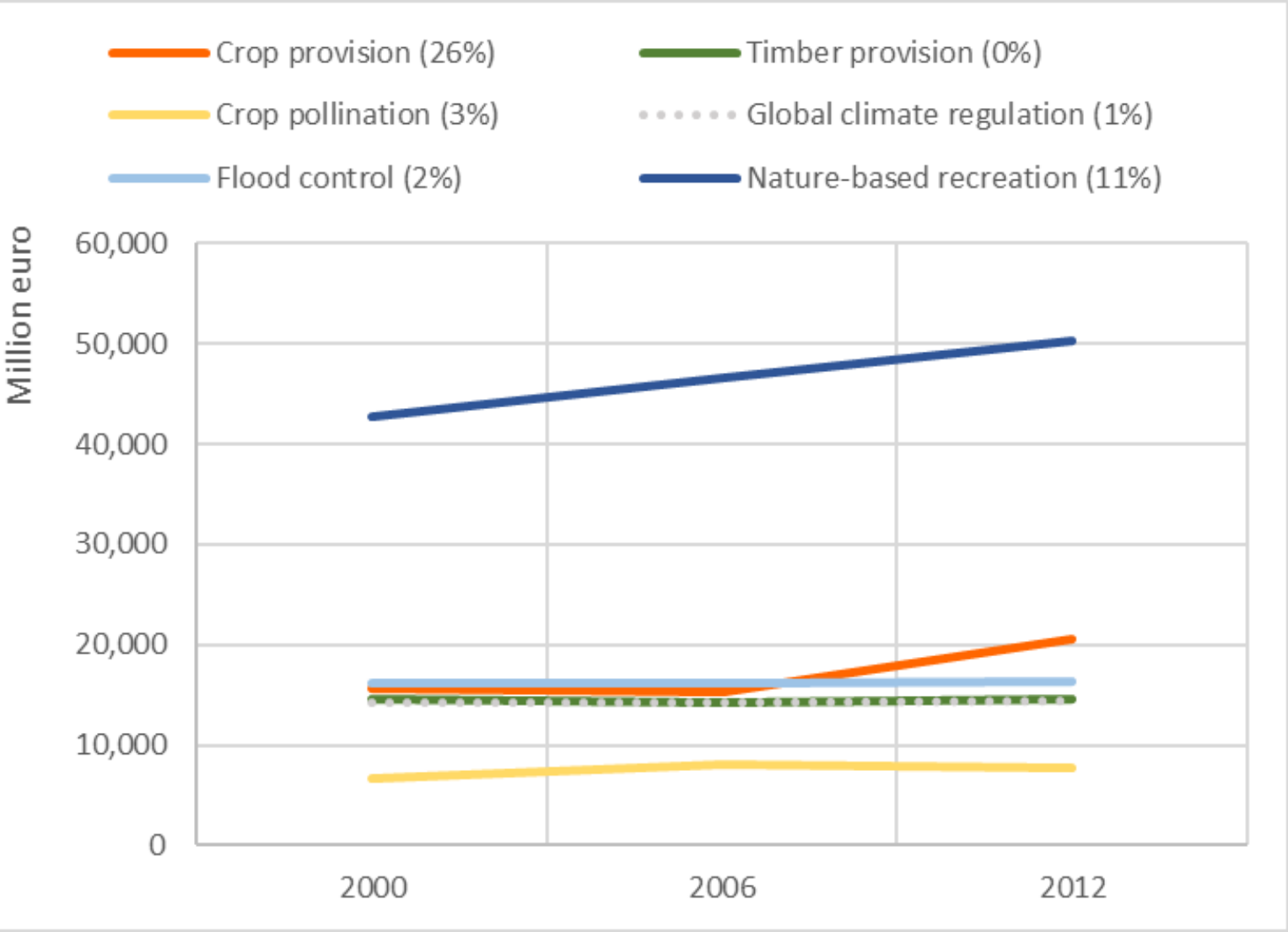
NA: not assessed

Values rounded to the nearest tens

56,370 euro/km^2 of green urban area

European Commission

Trends for ecosystem services



European Commission

GEP vs SEEA EEA

- GEP accounting and SEEA EEA very well aligned conceptually
- SEEA EEA defines Ecosystem services as:
  - *Contribution* to benefits (isolate the ecological contribution) *used* by economy+people
    - Only when there is demand, we record the ES transaction
  - *Final* ES (point of intersection with the economy)
    - Actual flows, sustainable flows recorded in complementary tables
  - ES underpinned by maps
  - Distinguish between physical and monetary units (P and Q's)
- Output is different (supply-use table -> integrate with sector accounts) vs index / headline indicator
- Difference: I-O/ SUT approach i.e. intermediate ES (e.g. pollination)
  - Distinguish ecosystem output from ecosystem value added

ES supply and use table (KZN, SA)

Resource \ Biome	Freshwater ecosystems	Grassland	Indian Ocean Coastal Belt	Savanna	Forests	Estuaries	Cultivated	Urban green space	TOTAL
Wood products (m^3)	3 524	695 637	235 125	787 295	267 047	169			1 988 797
Non-wood products (tonnes)	954	46 114	12 099	35 099	2 911	39			97 213
Livestock production (LSU)	3 264	1 671 992	103 866	443 249	4 404	1 334			2 228 109
Crop production (tonnes)							43 488 044		43 488 044
Experiential value (R millions)	26.59	434.34	249.52	448.82	100.05	58.44	249.39		1 567
Carbon storage (Tg C)	13.3	579.4	140.5	242.4	34.4	0.1	278.9		1 289
Pollination (R millions)	0.07	11.87	6.07	31.35	1.88	0.00			51.26
Flow regulation (million m^3)	116.78	1 114.81	243.38	648.82	362.45	39.52			2 526
Sediment retention (million tonnes)	0.01	21.00	1.02	12.43	1.26	0.00			35.72
Water quality amelioration (tonnes P)	-	35 410	5 721	13 823	854	21			55 829

Ecosystem service \ Economic user	Agric, Forestry and Fisheries	Water supply	Trade, catering & accommodation	Other sectors	House-holds	Govern-ment	Rest of world	Total
Wood products (m^3)					1 988 797			1 988 797
Non-wood products (tonnes)					97 216			97 216
Livestock production (LSU)	1 866 943				361 166			2 228 109
Crop production (tonnes)	42 014 992				1 473 052			43 488 044
Experiential value (R millions)			1 567					1 567
Carbon storage (Tg C)							1 289	1 289
Pollination (R millions)					51.26			51.26
Flow regulation (million m^3)	2 526							2 526
Sediment retention (million tonnes)		35.72						35.72
Water quality amelioration (tonnes P)		55 829						55 829

SEEA

Stylized example 1

- Integrating services into Supply and Use tables
- Assume we have a hypothetical simple economy
- GDP = 200

		Ecosystem	Economy	Household	Total
Supply					
Ecosystem service A					
Ecosystem service A					
Product X			200		200
Use					
Ecosystem service A					
Ecosystem service A					
Product X				200	200
Value added (supply less use)			200		**200**
				200	

Stylized example 2

- Integrating services into Supply and Use tables
- Suppose the economy depends on a ecosystem service B

		Ecosystem	Economy	Household	Total
Supply					
Ecosystem service A					
Ecosystem service A		50			50
Product X			200		200
Use					
Ecosystem service A					
Ecosystem service A			50		50
Product X				200	200
Value added (supply less use)		50	150		**200**
				200	

- This increases output, but GDP remains the same
- We have made the contribution by nature visible !

Stylized example 3

- Now suppose there is an additional ecosystem service A finally consumed by households (say an amenity service)

	Ecosystem	Economy	Household	Total
Supply				
Ecosystem service A	100			100
Ecosystem service A	50			50
Product X		200		200
Use				
Ecosystem service A			100	100
Ecosystem service A		50		50
Product X			200	200
Value added (supply less use)	150	150		**300**
			300	

- Now we see that both output and GDP of the economy changes

Stylized example 4

- The impact of including ecosystem services in the national accounts will depend on the type of services and their usage: output will increase but GDP may not
- Discussion ongoing in the recording of ES in sequence of accounts (Model A, B or C)
- Likewise, various possibilities exist for recording degradation in the accounts. By definition GDP will remain the same (but NDP may change)
- The key issue is around allocation of degradation:
  - The owner of the assets
  - The polluter of the asset
- These recording issues further discussed in revision process

Integrate in SNA sectoral accounts

	Model D			
	Farmer	Household	Ecosystems (public sector)	Total
Production and generation of income accounts				
Output—products	200			200
Output—ecosystem services	80		30	110
Total output	280			310
Intermediate consumption—products	0			0
Intermediate consumption—ecosystem services	80			80
Gross value added	200		30	230
Less consumption of fixed capital (SNA)	10			10
Less ecosystem degradation (non-SNA)				
(Degradation-adjusted) net value added	190		30	220
Less compensation of employees—SNA	50			50
(Degradation-adjusted) net operating surplus	**140**		**30**	**170**
Allocation/use of income accounts				
(Degradation-adjusted) net operating surplus	140		30	170
Compensation of employees		50		50
Ecosystem transfers		30	-30	0
Degradation transfer				
(Degradation-adjusted) disposable income	140	80	0	220
Less final consumption—products		200		200
Less final consumption—ecosystem services (non-SNA)		30		30
Less final cosumption - unpaid ecological costs		15		15
(Degradation-adjusted) net saving	**140**	**-165**	**0**	**-25**

SEEA

Qinghai pilot

- In practice / actual estimation, there seem to be several differences:
  - The comprehensive studies done on valuation in stats community find results in the order of 2 – 8 % of GDP (i.e. much lower than the results in Qinghai.
- (at first glance) some of the valuation approaches, are different:
  - Isolating the contribution / counting the full benefit
  - The scope of ES that have been included
  - Direct versus indirect uses (treatment of downstream water use)
  - Not always link to beneficiaries
  - Possible double counting (sediment retention / water quality amelioration), but also with the SNA
  - Different reasoning (choice of counterfactual)
- Would be interesting to discuss in greater detail !

Qinghai – detailed observations

- Water yield – not aligned (difference in scope and treatment)
- Soil retention; grossly aligned, no use of counterfactual (absence of vegetation)
- Sandstorm prevention – aligned, model includes location of beneficiaries – but high value is surprising
- Flood mitigation – I could not follow how storage (a stock variable) is linked to (avoided) damages (flow variable)
- Air purification – partly aligned: the model does not have a link to the population / beneficiaries, assumes all filtered air is used
- Water purification – aligned (would be interested to learn more how the coefficients were estimated)
- Carbon sequestration – more or less aligned
- Recreation – TCM – aligned, minor issue is whether to use also time spent in visit