Ecosysteemrekeningen & landschapselementen

Algemeen overzicht en de rol van landschapselementen in verschillende rapportageverplichtingen en toepassingen

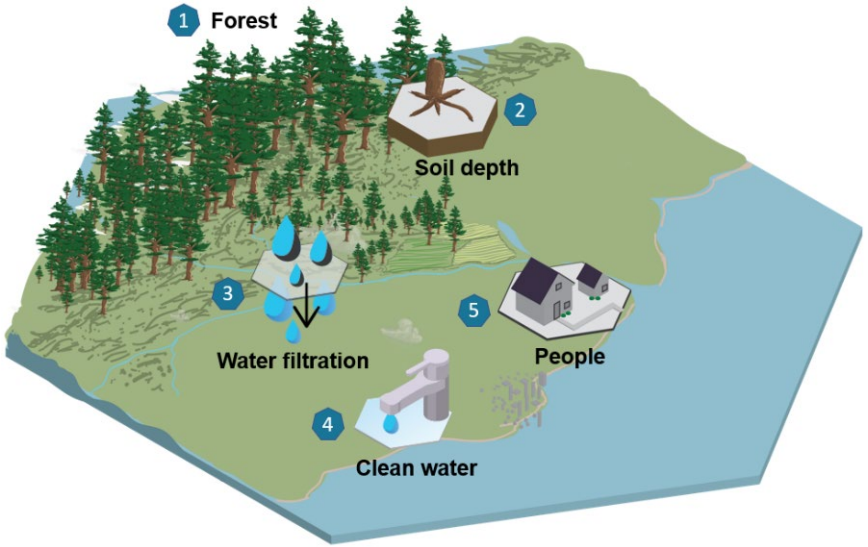
Patrick Bogaart en collega's

Themamiddag Monitoring Landschapselementen; 3 feb 2025

Algemeen – Landschapselementen **–** Extra

NKR/Ecosysteemrekeningen: Uitgangspunten

- **De mens maakt gebruik van de natuur…**
  - Wat, hoeveel, waar?
  - Wat is de *economische* waarde van dat gebruik?
  - En de bijdrage aan Brede Welvaart?
- **… maar wat betekent dat voor die natuur?**
  - Hoe *duurzaam* is dat gebruik?
  - Wat zijn de trade-offs?
  - Zijn er kansen voor synergie?



SEEA Ecosystem Accounting

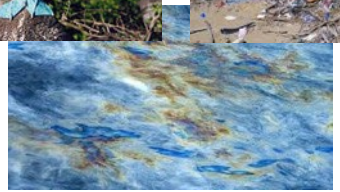
1) Ecosystem extent

Monetary value

3) Ecosystem services (supply)

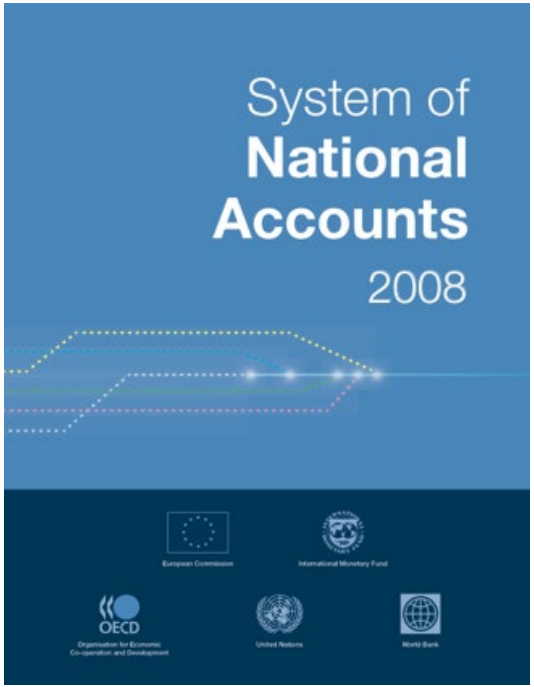
4) Ecosystem services (users)

2) Ecosystem condition

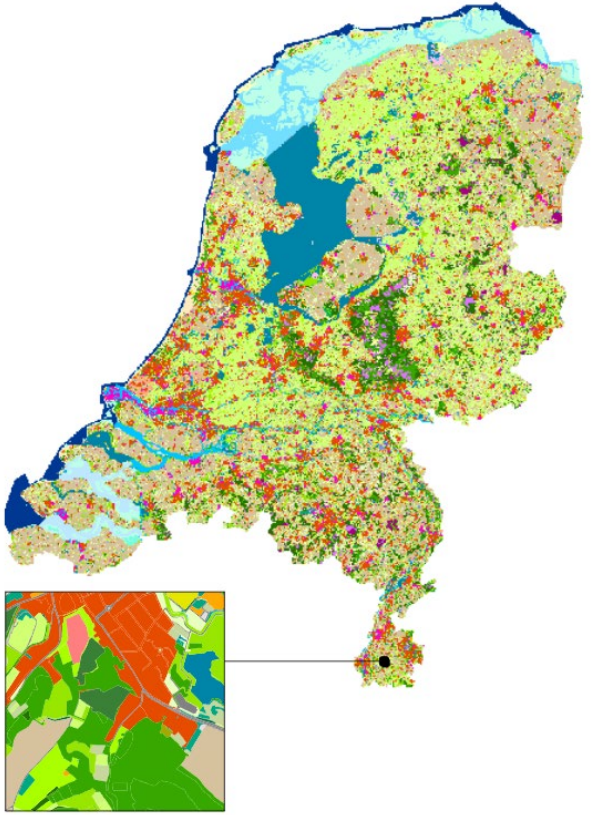


5) Pressure factors

UN *System of Environmental-Economic Accounts* (SEEA)



Extent: omvang van ecosystemen.



1.(Semi-) natuurlijk
- (Half-) natuurlijk bos
- Houtsingel
- Productiebos
- Overig bos
- Ruigte
- Heide
- Stuifzand
- Halfnatuurlijk gras
- Nat. akkerland
- Overig, anders
- Moerasbos
- Hoogveen
- Laagveen
- Waterloop
- Meer, plas
- Brakwater
- Kustduinen
- Kwelder
- Strand
- Intergetijdengebied
- Zandplaat
- Estuarium
- Noordzee
- Waddenzee

2.Agrarisch
- Akkerbouw, reg.
- Akkerbouw, ext.
- Meerjarig, reg.
- Meerjarig, ext.
- Grasland, blijvend
- Grasland, tijdelijk
- Grasland, ext.
- Glastuinbouw
- Pot- en containerteelt
- Braakliggend
- Faunarand

3.Bebouwde omgeving
- Bebouwd, urbaan
- Bebouwd, ruraal
- Bedrijfsterrein
- Grondgebonden
- Infrastructuur
- Landschapstuin
- Park
- Plansoen
- Groenvoorziening
- Semi-openb. groen
- Sportterrein
- Verblijfsrecreatie
- Overig zee (havens)
- Overig grasland
- Overig terrein

WAGENINGEN UNIVERSITY & RESEARCH

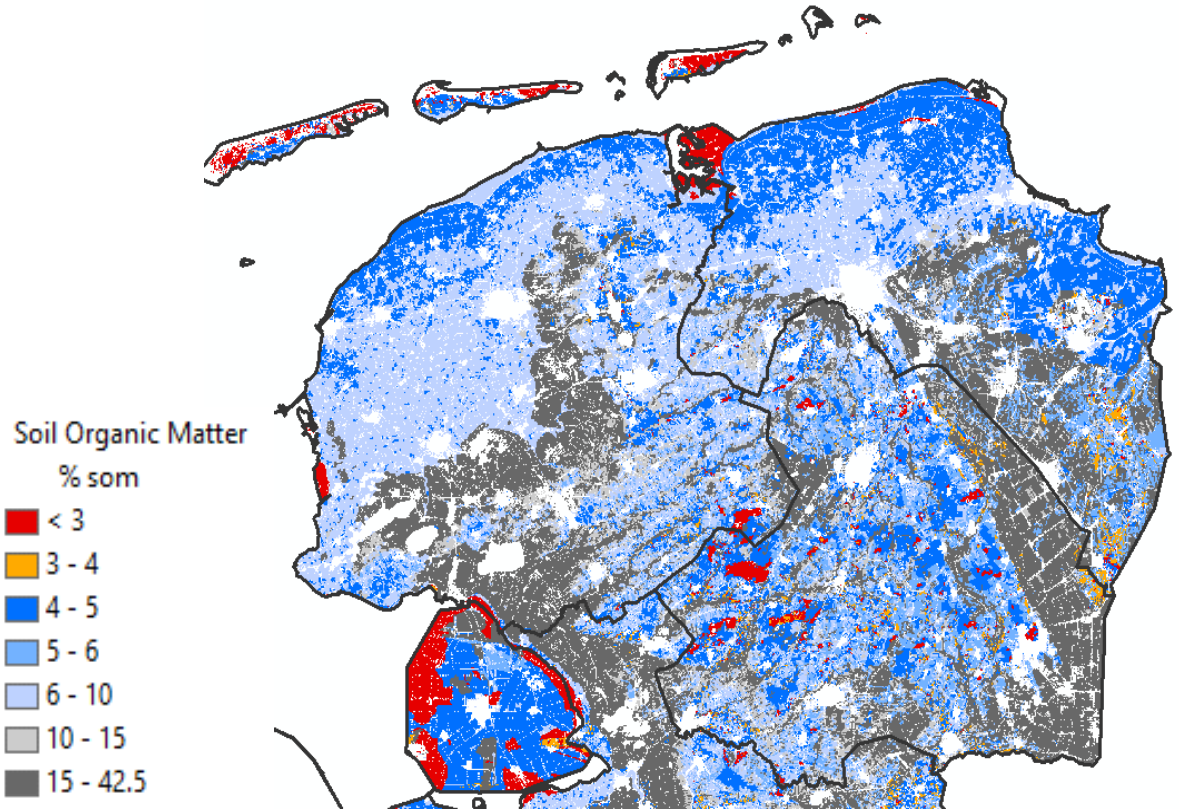
Extent: omvang van ecosystemen.

Tabel 1
Extentrekening naar ecosysteemtypen (km²), 2013-2020

	(Half-) natuurlijke ecosystemen										
	Bos					Open natuur					
	Totaal bos	(Half-) natuurlijk bos	Houtsingel	Productie-bos	Overig bos	Totaal open natuur	Ruigte	Heide	Stuifzand	Half-natuurlijk gras	Natuurlijk akkerland
Omvang 2013	3.475	1.459	81	1.631	304	1.890	22	350	46	1.424	49
Toename	74	68	10	73	52	230	5	18	6	205	6
Afname	106	95	10	84	44	246	3	15	6	231	4
Netto verandering	-31	-28	0	-12	8	-16	2	3	0	-27	1
Omvang 2015	3.443	1.431	81	1.619	312	1.874	24	353	47	1.397	50
Toename	84	91	8	37	39	240	10	30	10	204	9
Afname	105	59	11	72	54	235	5	25	4	212	10
Netto verandering	-22	31	-3	-35	-15	4	5	5	7	-8	-1
Omvang 2018	3.422	1.462	78	1.584	298	1.879	30	358	53	1.388	49
Toename	56	85	4	27	16	172	6	12	6	157	5
Afname	56	39	6	62	24	140	4	14	3	124	9
Netto verandering	-	46	-3	-35	-9	32	2	-2	3	33	-4
Omvang 2020	3.422	1.508	76	1.549	289	1.911	32	356	56	1.421	46

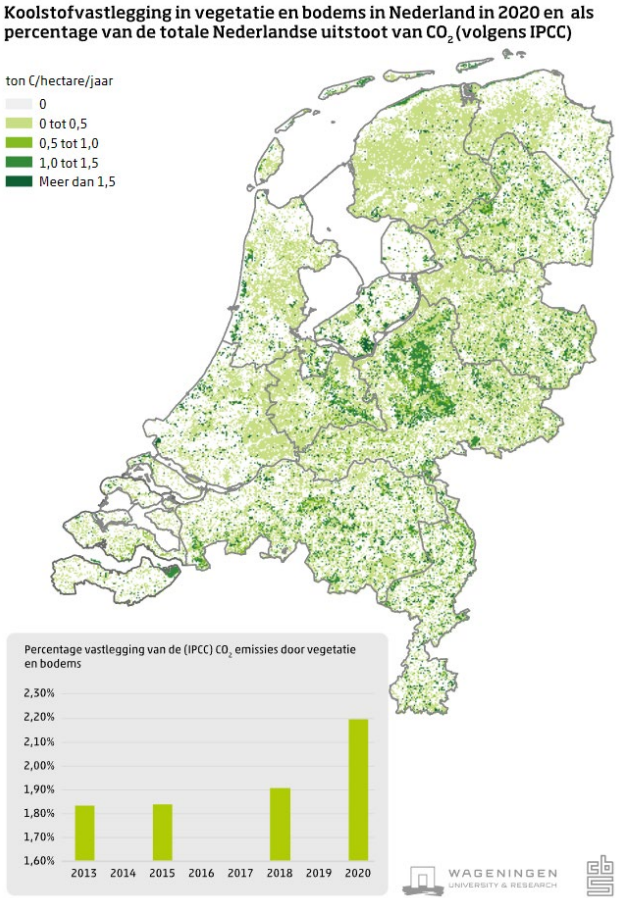
Condition: ecosysteemkwaliteit

- Abiotisch
  - Fysisch
  - Chemisch
- Biotisch
  - Structuur
  - Functie
  - Compositie
- Landschap



Aanbod en gebruik van ecosysteemdiensten

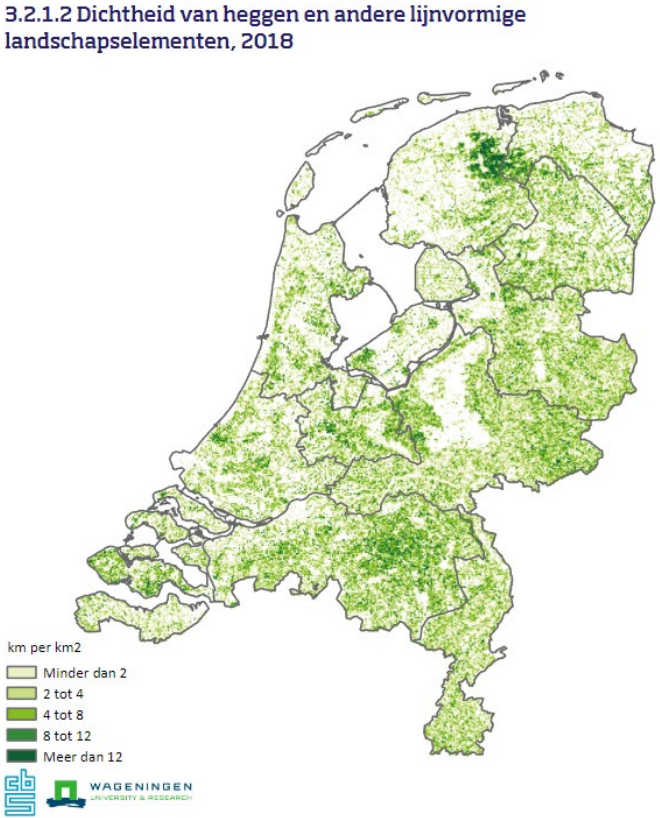
- Producerend
- **Regulerend**
  - Waterzuivering
  - Luchtfiltratie
  - Klimaatregulatie
    - Mondiaal ☞
    - Lokaal
  - Klimaatadaptatie
    - Regenwaterinfiltratie
    - Kustbescherming
  - Landbouwdiensten
    - Bestuiving
    - Plaagbestrijding
- Cultureel
- (Supporting)



Algemeen **– Landschapselementen –** Extra

Landschapselementen in NKR

- Top10NL
  - Detectie lin. polygonen
  - 2D -> 1D
  - 1D
- SNL
  - Nog niet gebruikt
- ANLb
  - Nog niet gebruikt



Landschapselementen in SEEA

3.47 The following treatments are recommended using the distinction between narrow and wide linear features and considering rivers and streams separately from other linear features.

i. For rivers and streams, width will change downstream along a river system, such that there will be a transition from 'narrow' upstream headwater reaches, to 'wide' downstream trunk rivers. Ideally, the area of sufficiently wide rivers and streams should be separately recorded. The treatment of this transition in the accounts will depend on the nature of the source data involved (e.g., between raster data, types of vector data). If delineating the area of rivers is not possible, they may be delineated in terms of length.

ii. For other linear features that are ecologically linked to surrounding landscape, such as ditches or hedgerows in a pasture landscape, it is recommended that they should not be separately identified and any associated area should be attributed to the ecosystem type of the surrounding ecosystem.

iii. For any linear features that are not ecologically linked to the surrounding landscape, such as forest access roads, the choice is to treat them like streams and rivers if sufficiently wide (i.e., as a distinct ecosystem type with an associated area), or to include them with the surrounding ecosystem types (i.e., without an associated area). This choice should be guided by the added value that a separate ecosystem type would have for the account or its applications.

Landschapselementen in SEEA

4.38 An example of a presentation showing this distinction is presented in Table 4.3 where (larger) rivers are shown having both area and length while smaller rivers and streams are recorded as having only length. The fact that narrow linear features have an assumed area of zero, does not disqualify them from being ecosystem assets with an associated condition or the potential to supply ecosystem services.

Table 4.3: Presentation of closing balances including both one and two dimensional ecosystem types

Ecosystem type		Extent	
		Area (km^2)	Length (km)
2D	Forest	345	
	Lakes	50	
1D	Rivers	5	50
	Streams		200
Total		**400**	**250**

Landschapselementen in CBD-GBF

			Ecosystem Integrity Index
2	2.2 Area under restoration	Extent of natural ecosystems by type Maintenance and restoration of connectivity of natural ecosystems	Habitat distributional range Index of Species Rarity Sites, High Biodiversity Areas, Large Mammal Landscapes, Intact Wilderness and Climate Stabilization Areas Increase in secondary natural forest cover Annual tropical primary tree cover loss Forest Landscape Integrity Index Global Ecosystem Restoration Index Free flowing rivers Percentage of cropped landscapes with at least 10 per cent of natural land Bioclimatic Ecosystem Resilience Index (BERI) Priority retention of intact / wilderness areas Status of key biodiversity areas Biodiversity Habitat Index Red List Index Red List of Ecosystems Living Planet Index Species habitat Index

Landschapselementen in Natuurherstelwet

Artikel 11

Herstel van landbouwecosystemen

1. De lidstaten nemen de herstelmaatregelen die nodig zijn om de biodiversiteit van landbouwecosystemen te verbeteren, naast de gebieden waarop herstelmaatregelen uit hoofde van artikel 4, leden 1, 4 en 7, van toepassing zijn, waarbij zij rekening houden met klimaatverandering, de sociale en economische behoeften van plattelandsgebieden en de noodzaak duurzame landbouwproductie in de Unie te verzekeren.

2. De lidstaten nemen maatregelen die tot doel hebben op nationaal niveau een toenemende trend te realiseren voor minstens twee van de volgende drie indicatoren voor landbouwecosystemen, zoals nader gespecificeerd in bijlage IV, te meten in de periode vanaf 18 augustus 2024 tot en met 31 december 2030, en vervolgens om de zes jaar, totdat bevredigende niveaus zijn bereikt zoals vastgesteld overeenkomstig artikel 14, lid 5:

a) de graslandvlinderindex;

b) de voorraad organische koolstof in minerale bodems onder bouwland;

c) het percentage landbouwgrond met landschapselementen met hoge diversiteit.

Landschapselementen in EU EA verordening

		ecosystem type.	
3. Grassland	3.1 Sown pastures and other grass (modified grasslands)	Stable grassland characterised by agricultural use or strong human disturbance. Floral composition dominated by *Graminaceae* and shaped by human activity. Regularly re-sown and fertilised and used for grazing or mechanical harvesting of grass. Small semi-natural elements which are associated with agricultural land use, such as hedges, ponds, grassy margins etc., are considered part of this ecosystem type.	CORINE 2.3.1 Pastures (modified grassland)
	3.2 Natural and semi-natural grasslands	Grasslands under no or moderate human influence. Low productivity grasslands composed of native species adapted to the local environment. Often situated in areas of rough, uneven ground, steep slopes or wetter	CORINE 3.2.1 Natural grassland

Landschapselementen in EU EA verordening

	application.	
2.1.11 Semi-natural elements associated with agricultural land use in annual cropland	Traditional agricultural land use and landscape elements including hedges, ponds, grassy margins etc. as part of the farmed area. Such remaining semi-natural elements are considered part of cropland (and grassland) and can be mapped separately. Treelines and hedgerows are often easiest to distinguish. Member States are requested to fully document the type of landscape elements included in this class where it is reported separately.	
2.2.1 Rice fields (C2000)	Inundated or inundatable fields used for the	EU

Landschapselementen in NKR toepassingen

- Mondiaal
  - Global biodiversity framework
- Europees
  - Ecosysteemrekening-verordening
  - Natuurherstelwet
  - Bossenstrategie
  - Bestuivers

- Nationaal
  - NPLG
  - Monitor Brede Welvaart
  - Basiskwaliteit Natuur
  - Deltaplan Biodiversiteit
  - Aanvalsplan landschap
  - Collectief Natuurinclusief
  - …?

  - Blauwe landschapselementen?

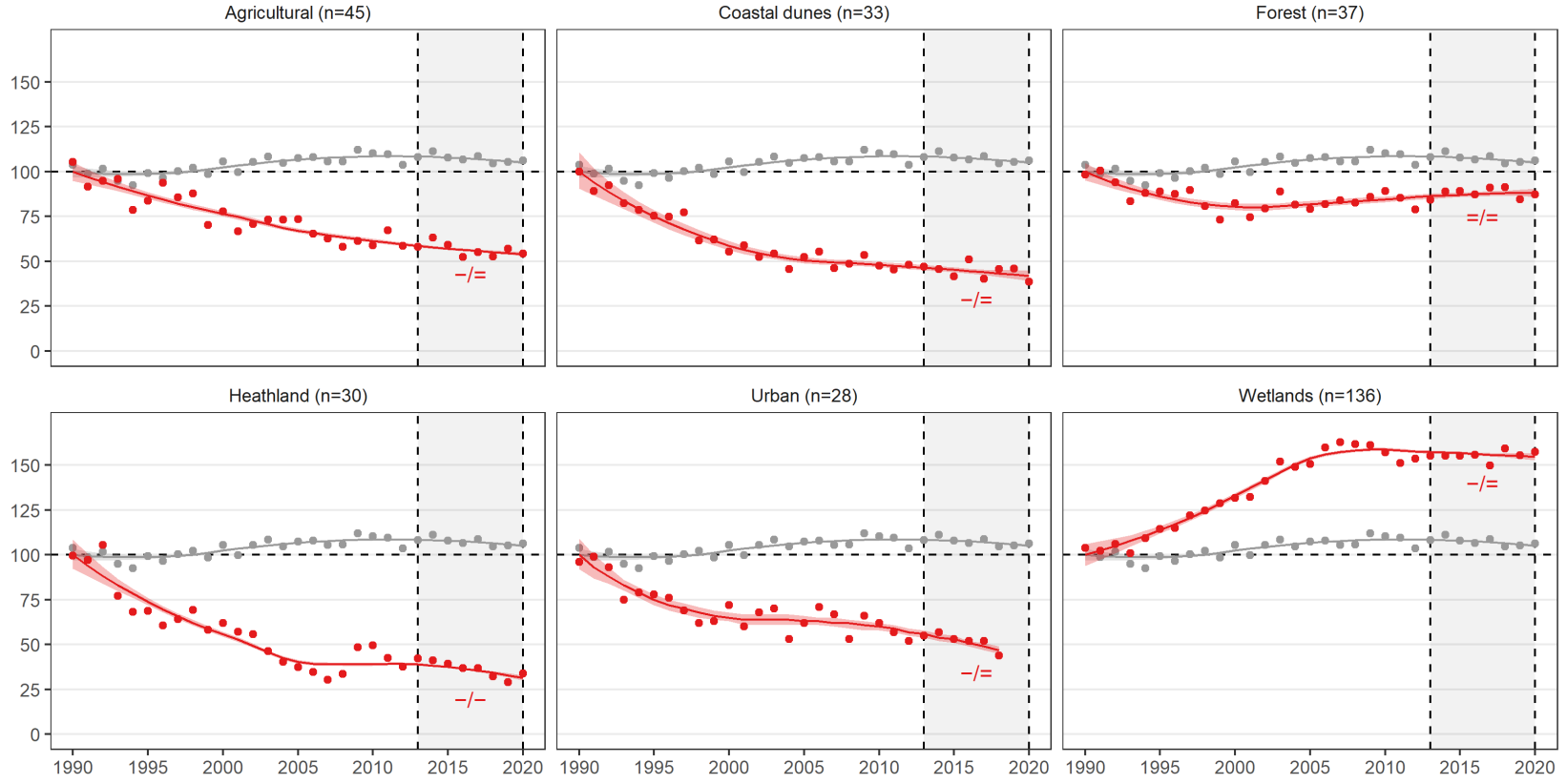
Conclusies

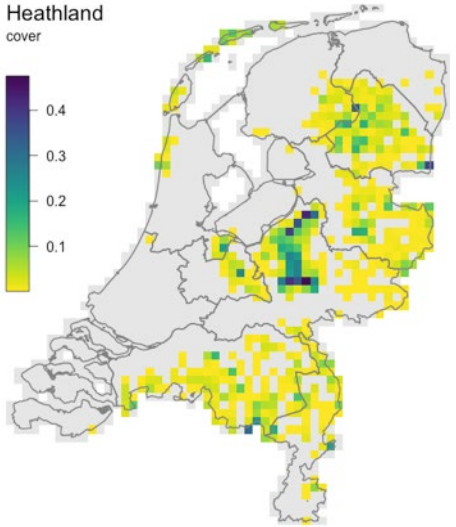
- Landschapselementen onderdeel van ecosysteemrekeningen
  - Expliciet: als 2D of 1D assets
  - Impliciet: als onderdeel van condition
  - Als leveranciers van ecosysteemdiensten
- Onderdeel van (vnl. EU) rapportageverplichting
  - Milieurekeningenverordening
    - Toeleverend aan Natuurherstelwet
- Groot aantal beleidstoepassingen
- Data gaps
  - m.n. kleinere (sub Top10NL) elementen
  - Blauwe elementen

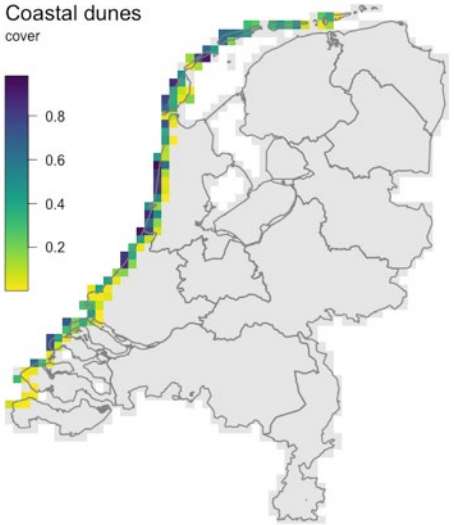
Algemeen – Landschapselementen – **Extra**

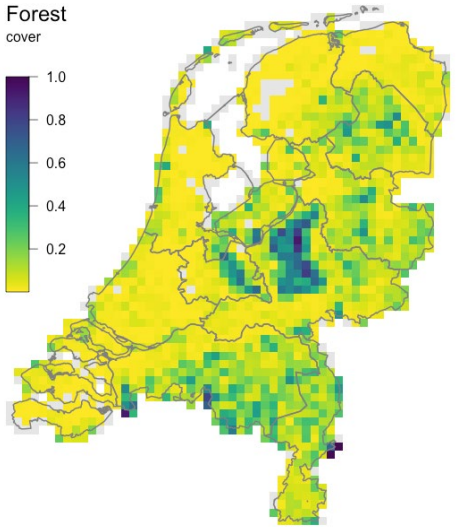
Condition: Biodiversiteit

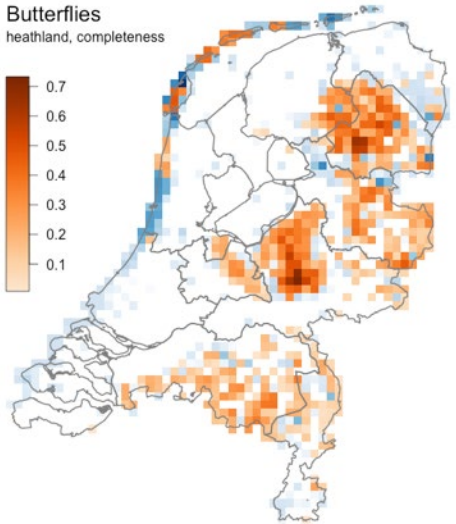
Living Planet Index (per broad ecosystem type)
(1990=100)

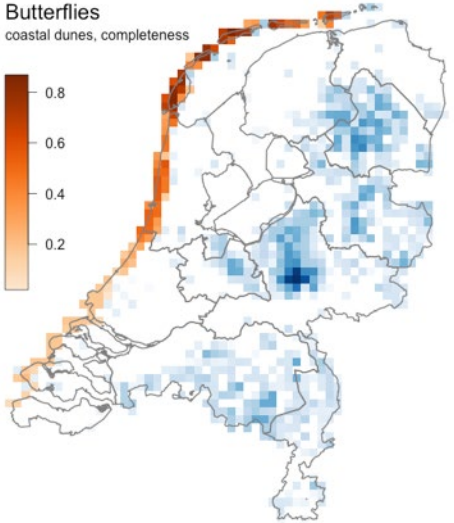


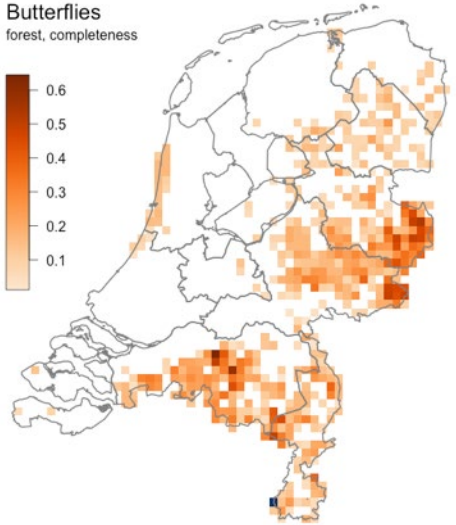

Heathland
cover
0.4
0.3
0.2
0.1


Coastal dunes
cover
0.8
0.6
0.4
0.2


Forest
cover
1.0
0.8
0.6
0.4
0.2

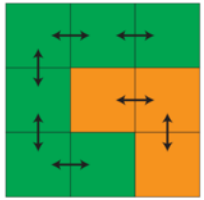

Butterflies
heathland, completeness
0.7
0.6
0.5
0.4
0.3
0.2
0.1


Butterflies
coastal dunes, completeness
0.8
0.6
0.4
0.2

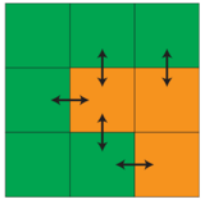

Butterflies
forest, completeness
0.6
0.5
0.4
0.3
0.2
0.1

Landscape spatial structure

a)



b)



c)

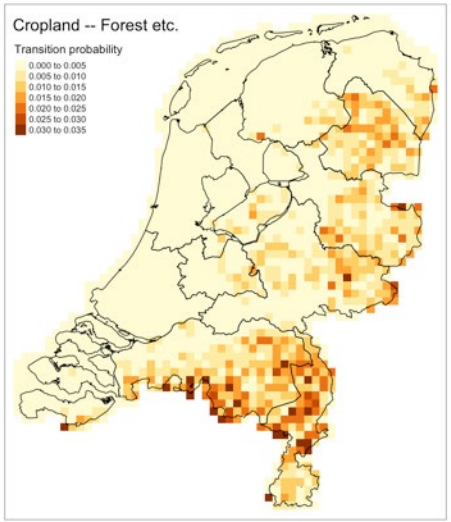
Land cover classes

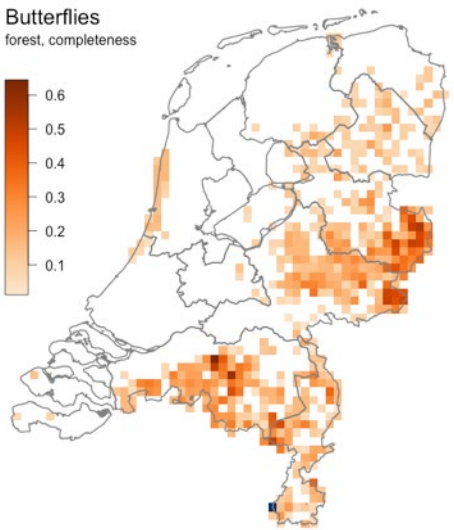
- A
- B

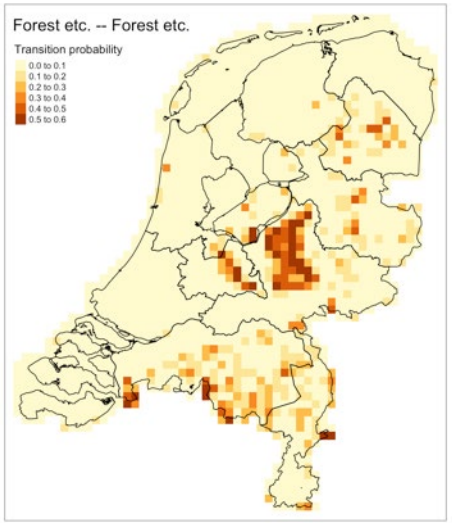
	A	B
A	10/24	5/24
B	5/24	4/24

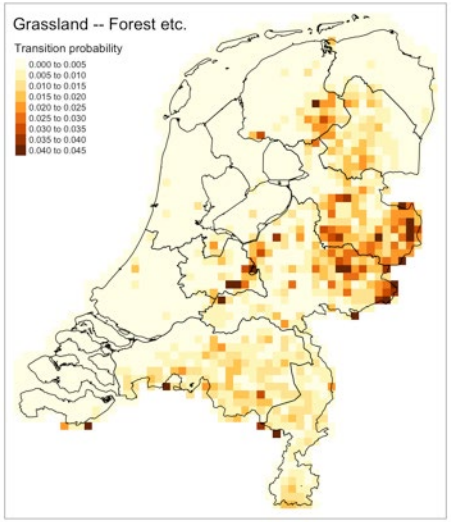
d)

Ex. 1: forest

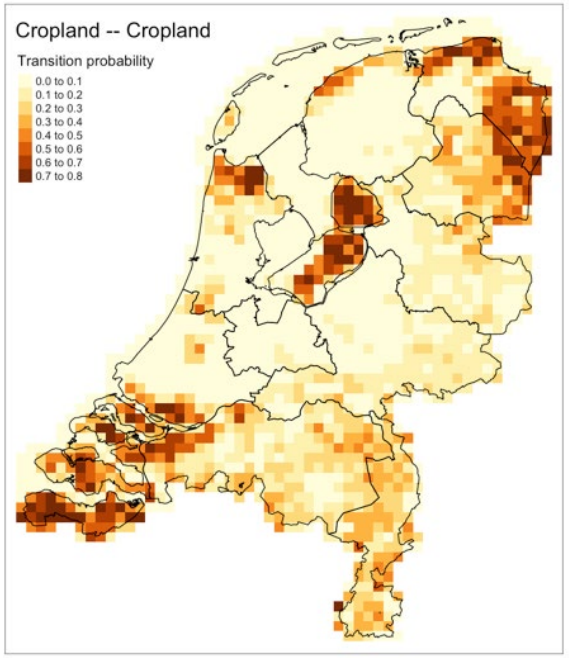

Cropland -- Forest etc.
Transition probability
0.000 to 0.005
0.005 to 0.010
0.010 to 0.015
0.015 to 0.020
0.020 to 0.025
0.025 to 0.030
0.030 to 0.035

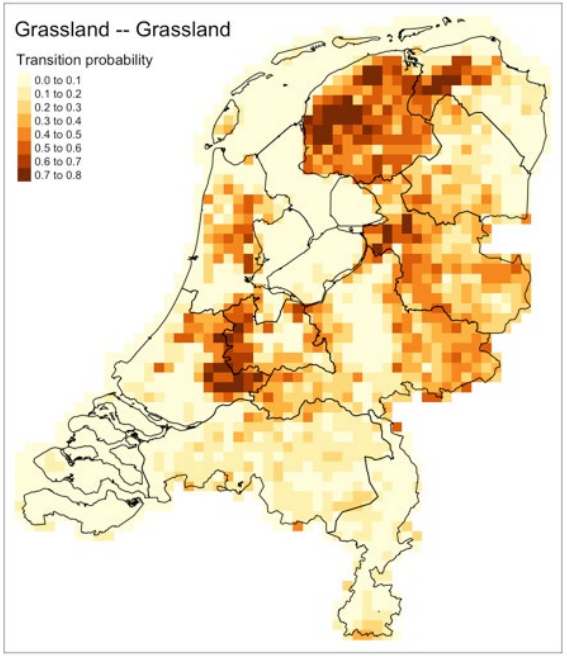

Butterflies
forest, completeness
0.6
0.5
0.4
0.3
0.2
0.1

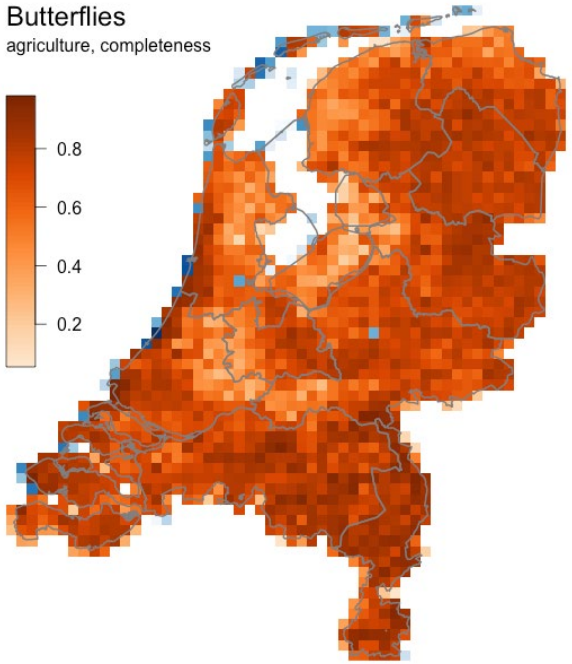

Forest etc. -- Forest etc.
Transition probability
0.0 to 0.1
0.1 to 0.2
0.2 to 0.3
0.3 to 0.4
0.4 to 0.5
0.5 to 0.6


Grassland -- Forest etc.
Transition probability
0.000 to 0.005
0.005 to 0.010
0.010 to 0.015
0.015 to 0.020
0.020 to 0.025
0.025 to 0.030
0.030 to 0.035
0.035 to 0.040
0.040 to 0.045

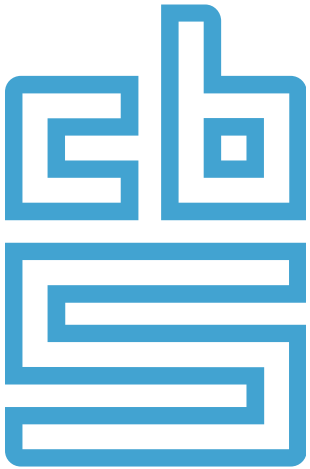
Ex. 2: agricultural ecological ‘deserts’







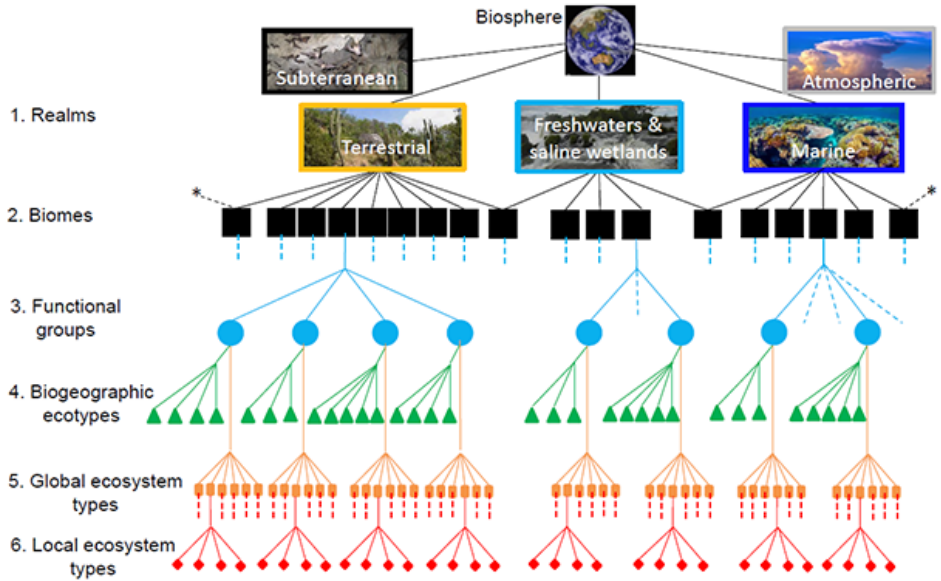
https://www.cbs.nl/en-gb/society/nature-and-environment/natural-capital



Voor wat er **feitelijk** gebeurt

IUCN Global Ecosystem Typology (GET)

- Developed top support the *Red List of Ecosystems*
- Based on ecosystem processes / functioning
  - “Ecological assembly theory”



IUCN Global Ecosystem Typology (GET)

T: Terrestrial realm*: 7 biomes*

T2 Temperate-boreal forests and woodlands: *6 functional groups*

T2.1 Boreal and temperate high montane forests and woodlands

T2.2 Deciduous temperate forests

T2.3 Oceanic cool temperate rainforests

T2.4 Warm temperate laurophyll forests

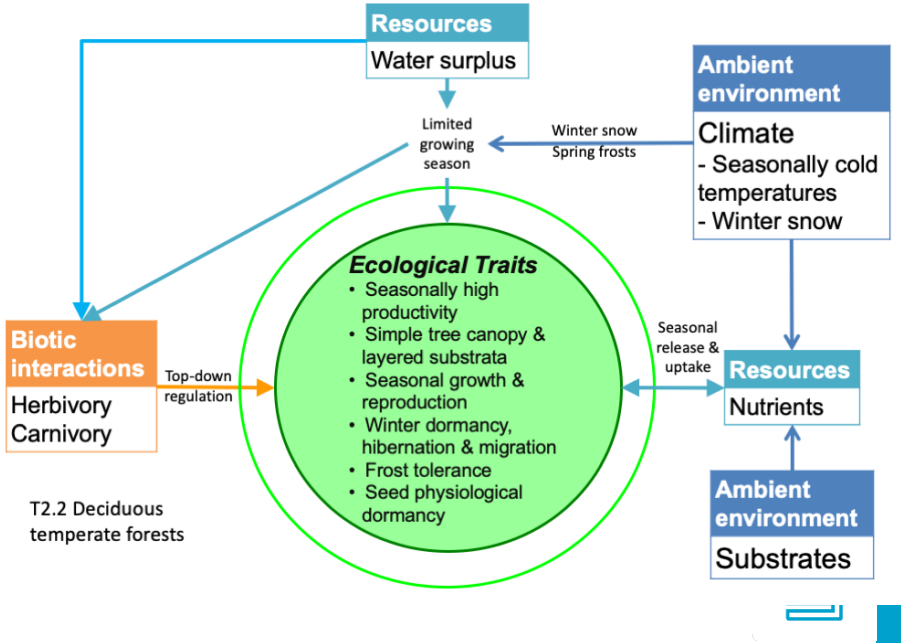
T2.5 Temperate pyric humid forests

T2.6 Temperate pyric sclerophyll forests and woodlands

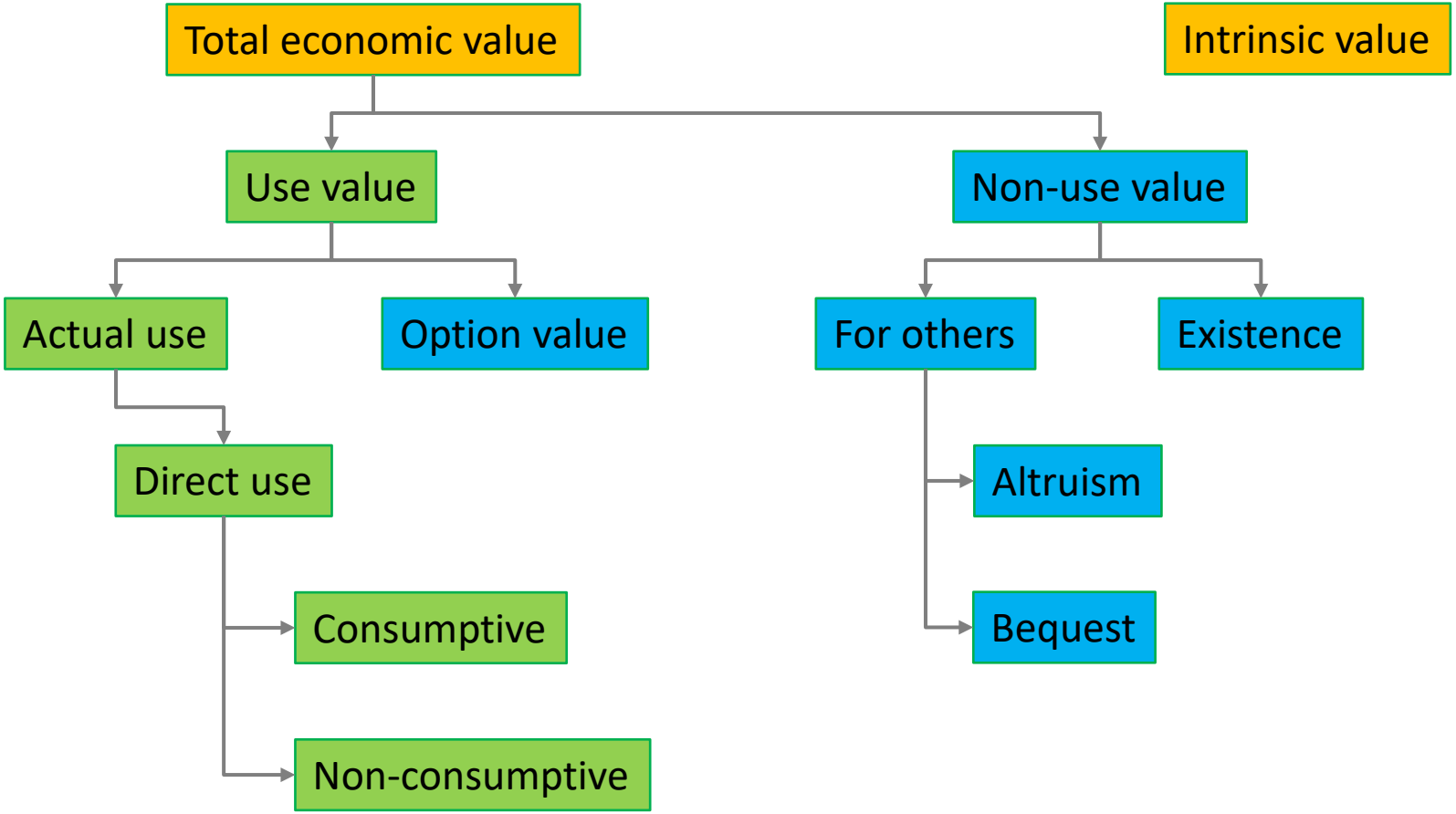
IUCN Global Ecosystem Typology (GET)

T2.2 Deciduous temperate forests

"At cool temperate latitudes in the Northern hemisphere, fertile soils and high precipitation support forests dominated by broadleaf deciduous trees, although evergreen needleleaf trees may account for up to one-third of the canopy. Cold snow-prone winters punctuate a limited but highly productive growing season. Fungi and bacteria play vital roles in decomposition of the seasonal leaf fall on the forest floor, with insects and browsing herbivores important in carbon and nutrient cycling. Herbivores such as deer and hares are prey to feline, canine and avian predators. Winter dormancy, hibernation and migration are key strategies enabling survival of plants and animals."



Waarderingstypes



De economische gebruikswaarde van het natuurlijk kapitaal