Natural Capital Accounting in Belgium

Steven Broekx, VITO

Merlijn Jocqué, INBO

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 817527

Project context

Combined project results of:

- Pilot study on natural capital accounting in Flanders
  -> produce 4 accounts (financed by Environment and Spatial Planning department) - VITO

- MAIA pilot Belgium - VITO and INBO

- Eurostat project “Building and testing pilot ecosystem accounts for Flanders” (2020-BE-ECOSYSTEM) – INBO and Flanders Statistics authority

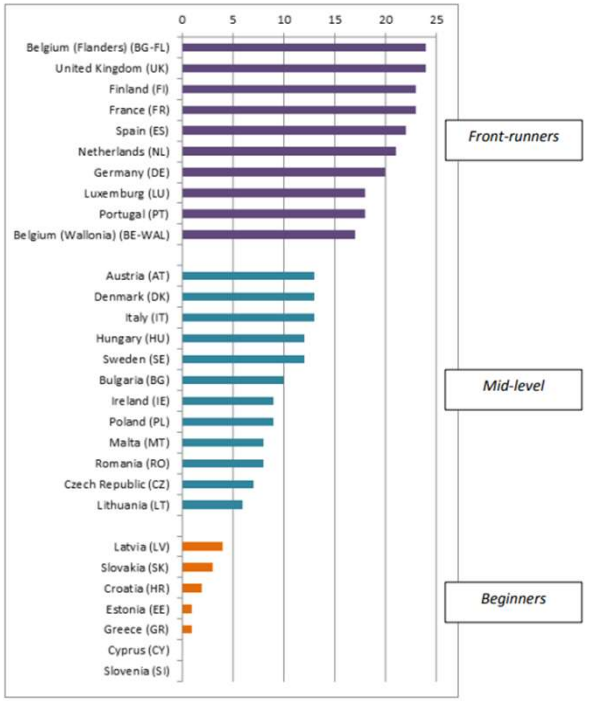
Pilot accounts

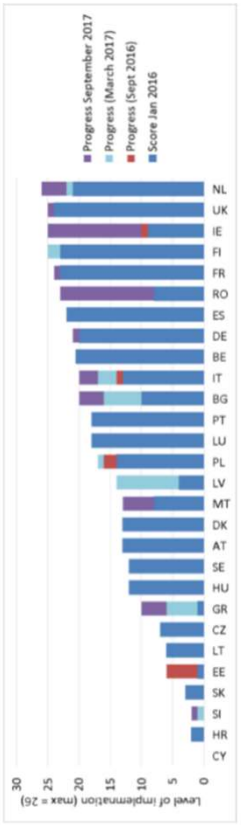
- Extent account

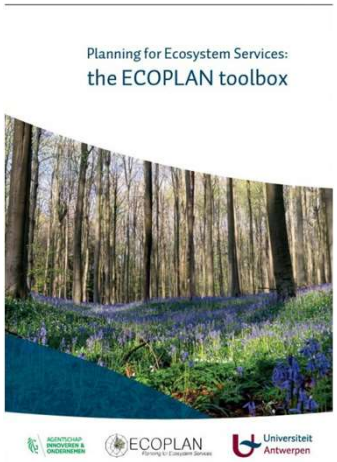
- Ecosystem service accounts
  - Wood provision
  - Global climate regulation: carbon storage in biomass
  - Water flow regulation (infiltration and contribution to groundwater table)
  - Amenity - health impacts due to nearby ecosystems

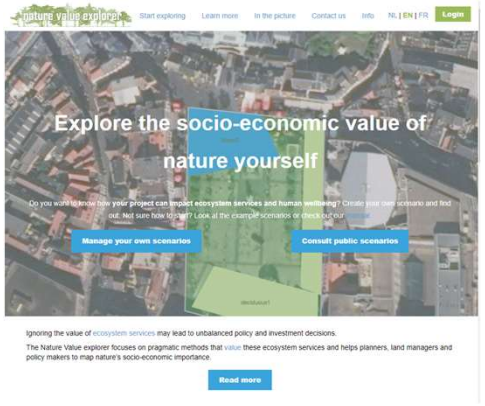
- Maps
- Biophysical and monetary indicators

Mapping and assessment ecosystem services









Results Esmeralda project

From ecosystem services to natural capital accounts

- Supply use tables
- Monitoring trends in time (ex post) versus predicting the impact of projects on ecosystem services (ex ante)
- Data consistency in time!
- Statistical offices vs. environment administrations

User requirements

- Core group NCA in Flanders
- Stakeholder workshop
- Individual working groups per account

“We want statistics to be used. Demand-driven assessments are key.”

“Standardization, a central knowledge base on ecosystem service accounts.”

Different needs for individual accounts: environment administrations working on water, climate, health, … with a long tradition in environmental modeling

Pilot accounts

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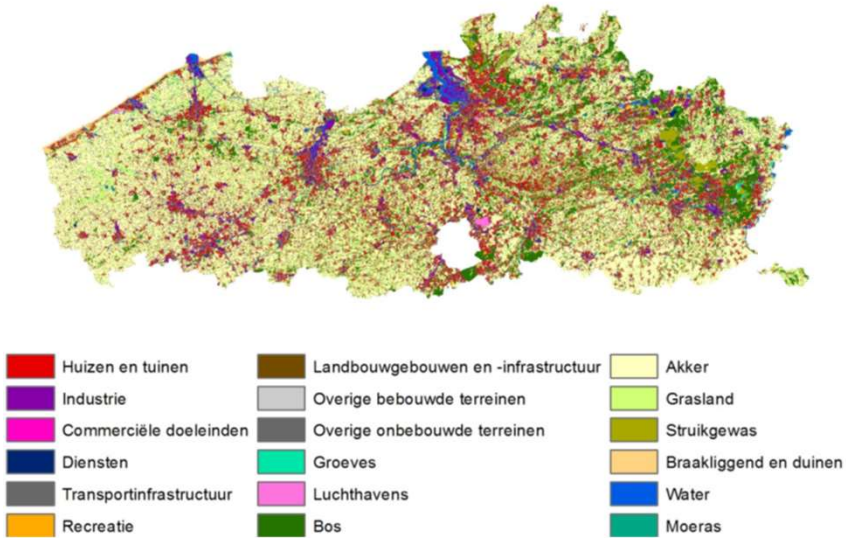
Extent account – production of account

Selection based on available ecosystem types, accessibility, frequency of updates, accuracy and scale

Land use file Flanders

- 3-yearly updates
- 10x10m resolution
- Combination of maps
  - Agriculture map (crop types)
  - GRB (residential types)
  - Habitat map (ecosystem types)
  - Groenkaart (presence of small green elements)



Extent account - validation

- Evaluation of >3000 points on the basis of aerial photographs and additional information (10 evaluators)
- Land use 2013 and 2016, land use change
- The overall accuracy of the maps is 60.3% for 2013 and 71.9% for 2016, 46.1% for land use change.
- Main issues: interpretation of aerial data (groenkaart) dry versus wet year, mix of reference years in habitat map.
- “Uncertainty in the ecosystem classification is too large to detect short term trends or make statements about ecosystem changes”

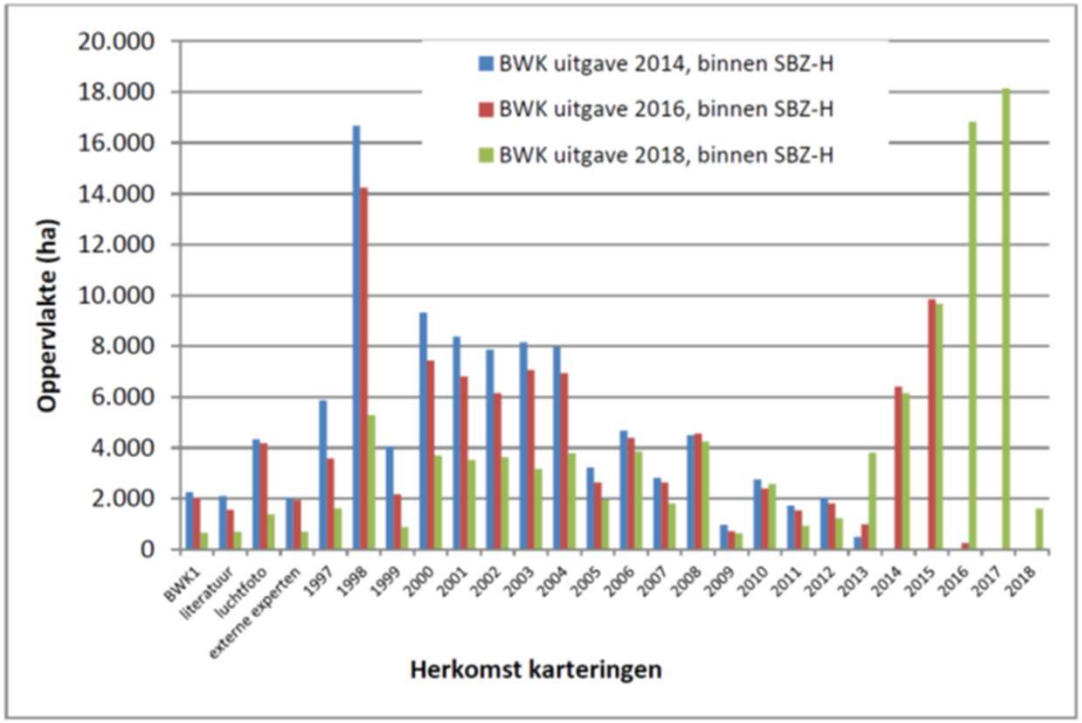
Ecosystem types 2016 vs 2018?

Year of observation ecosystem types in nature 2000 areas in habitat maps

2016 = +/- 2004 on average

2018 = +/- 2015

Source: INBO



Extent account - validation

- Improvements tested and validated

1) Forest surface: use Forest cover file.
2) Soil sealing map
3) Better classification of (permanent) grasslands.

Challenge remains (only small improvements)

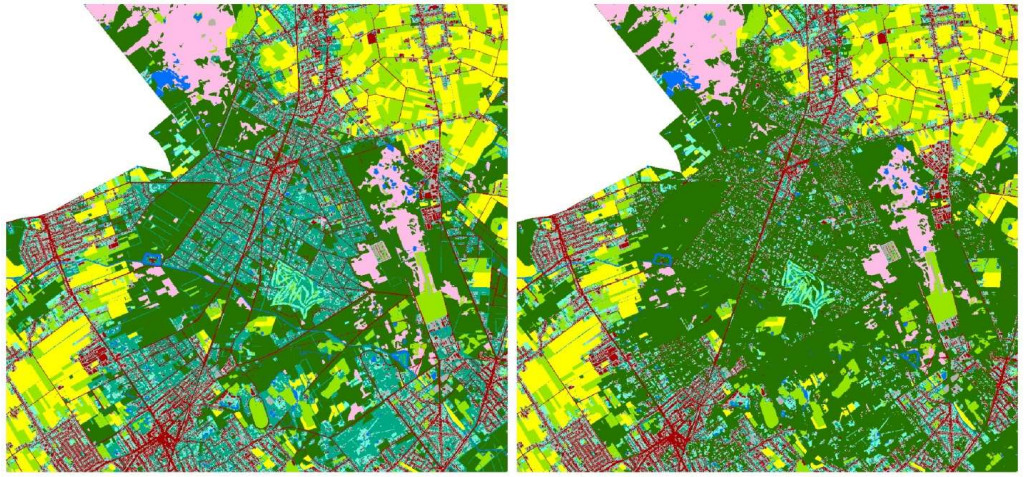


Figure. Extract of the original land use file (left) and adjusted land use file with the forest cover file (Boswijzer) illustrating the change in forest cover (dark green).

Jocque M., Maarten S., Raïsa C., Carine W., Van Reeth W., Poelmans L. 2022. Steps towards an improved extent account for Flanders. 29 April 2022. Report. D1.1. *2020-BE-ECOSYSTEM.*

Supply Use tables

Supply per ecosysteem-type		Akker	Grasland	Bossen	Moeras	Struikgewas	Water	Braak en duinen	Transport infra	Urbaan	Totaal
Indicator	**Eenheid**										
Oppervlakte	ha	420.729	405.531	200.412	2.427	34.441	39.314	96.023	81.213	79.149	1.359.239
Biofysisch											
Houtproductie	m^3			924.059							924.059
C-opslag biomassa	ktonC			55							55
Watervoorziening	miljoen m^3	880	924	515	5	74	0	178	42	51	2.669
Gezondheid	DALY	27.303	47.642	23.712	229	3.196	4.396	583	0	0	107.061
Monetair											
Houtproductie	miljoen €/jaar			21							21
C-opslag biomassa	miljoen €/jaar			12							12
Watervoorziening	miljoen €/jaar	53	55	31	0	4	0	11	3	3	160
Gezondheid	miljoen €/jaar	973	1.697	845	8	114	157	21	0	0	3.814
Totaal	miljoen €/jaar	1.025	1.752	909	8	118	157	31	3	3	4.007
Gemiddelde	€/ha	2.437	4.321	4.536	3.486	3.436	3.983	327	31	39	2.948

Amenity – health benefits

- Health benefits = avoided physical and mental illness + longer life expectations due to the presence of nearby greenspace (% green area 1 - 3 km around place of residence)
- "**green**" areas = all green land use, including parks, forests, agriculture, gardens (private and public), small informal green areas, surface waters
- **Exposure** = contact with = recreation + sport + view on green + …
- In addition to other benefits (e.g. the air pollution removal) from green spaces
- **Monetary Benefits** = avoided health care costs (e.g. hospitalization)
  + productivity gains (less absenteeism)
  + welfare gains (suffering, life years gained)

Exposure to green

Green exposure indicator

- Detailed assessment of share of green areas, esp. in urban areas
- Precise info over place of residence
- Flanders : detailed land use map (10 x 10) + consistent interpretation

Limitations

- Challenging to assess changes over time (interpretation vs real changes)
- Rough indicator that does not reflect impact of policy measures that affect quality, accessibility, of green space

Dose response relationships

Dose response relationships from selected studies morbidity and meta-analysis (mortality)

Important : 2% - 5% lower impacts for 10 % more green area

Total impact: 9% reduction health impacts (Daly's)
(disability adjusted life years)

	+ 10 % Green area (1)	
Dosis-effect relation	impact	95% interval
Morbidity		
Mental health		
Anxiety disorders	-5%	(-3% - -6%)
Depression	-4%	(-2% - -6%)
Physical health		
Coronary heart disease	-3%	(-1% - -5%)
Diabetes mellitus	-2%	(-1% - -3%)
Heart failure	-2%	(-1% - -3%)
Asthma	-3%	(-2% - -4%)
Mortality (3)		
cardio vascular	**-4%**	(-2% - -6%)
Importance DALY /1000 inhab.		
Mental health	-1,14	(-0,6 - -1,5)
Physical health	-0,95	(-0,5 - -1,8)
Total morbidity	**-2,36**	(-1,2 - -3,4)
Mortality		
Years life lost	**-1.5**	(-0,7 - -2,3)

Monetary valuation

- Approach per type of health impact
  - Avoided health costs: costs of illness data from Belgium/European countries-studies
- Beneficiaries: health care sector, (patients)
  - Avoided absenteeism: literature (Belgium/European) and wage costs (Belgium)
  - Beneficiaries: Industry and services (patients)
- Welfare gains: valuation morbidity and years of life lost
  - Beneficiaries: patients
  - More uncertain : Based on European, older studies
- Important benefit: average estimate 1% of GDP

Amenity – health benefits - validation

Approach

Stakeholder analysis with online questionnaire

Suggestions for improvement:

- Extending health conditions included (also negative health effects of ecosystems)
- Updating **dose-effect relationships** (include quality dimensions of ecosystems)
- Include actual ecosystem exposure
- Assess and monitor cost data of healthcare expenditures, loss of labor, productivity and welfare loss due to pain and suffering as well as the burden of disease in disability-adjusted life years.

What's next?

- Not very clear
- Overarching activities – core group on NCA not very active. Lack of framework and ownership. Hope on EU legislation?
- Initiatives ongoing for individual accounts in specific policy domains
  - Ecosystem services in spatial planning
  - Climate adaptation policy e.g. local climate regulation and impact on health
  - Health policy

Lessons learned

- Validation is important. Trends ? We are not there yet.
- Importance of legislation and ownership, but go beyond tick box production of accounts by statistical offices.
- Boundary condition: build on datasets, models already developed elsewhere for authorities, even if they are not the best approach. Leave openness for country specific approaches.
- Data demand - contribution of ecosystems often overlooked or approached very roughly in other policy domains. We often find less answers than expected.

MAIA
Mapping and Assessment for Integrated ecosystem Accounting

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http://maiaportal.eu/

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