The carbon account of the Netherlands

Compilation and use

Redbad Mosterd
Statistics Netherlands (CBS)

Content

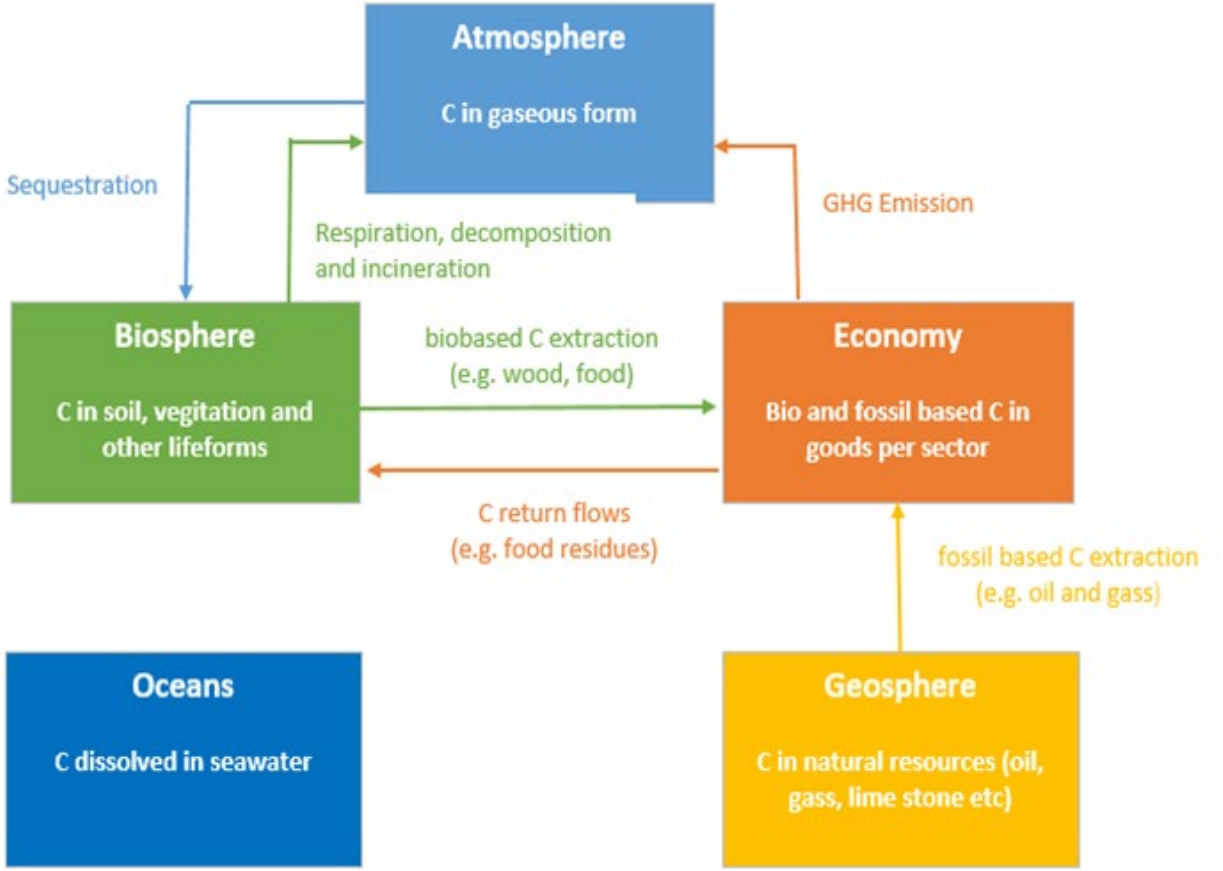
- Context and framework
- Biocarbon
- “Geocarbon”
- Carbon in the economy
- Carbon in the atmosphere
- Policy relevance
- Issues and future work

Context and framework

Carbon account

- Flows and changes in carbon stock recognized from **human** activities and **natural** processes.
- Consistent and **quantitative comparison** of carbon stocks and flows in reservoirs.
- **SEEA EA** promotes the development and implementation of thematic accounts.
- **Integrates** data from other environmental accounts.
- Builds upon, but goes beyond, current carbon reporting systems.

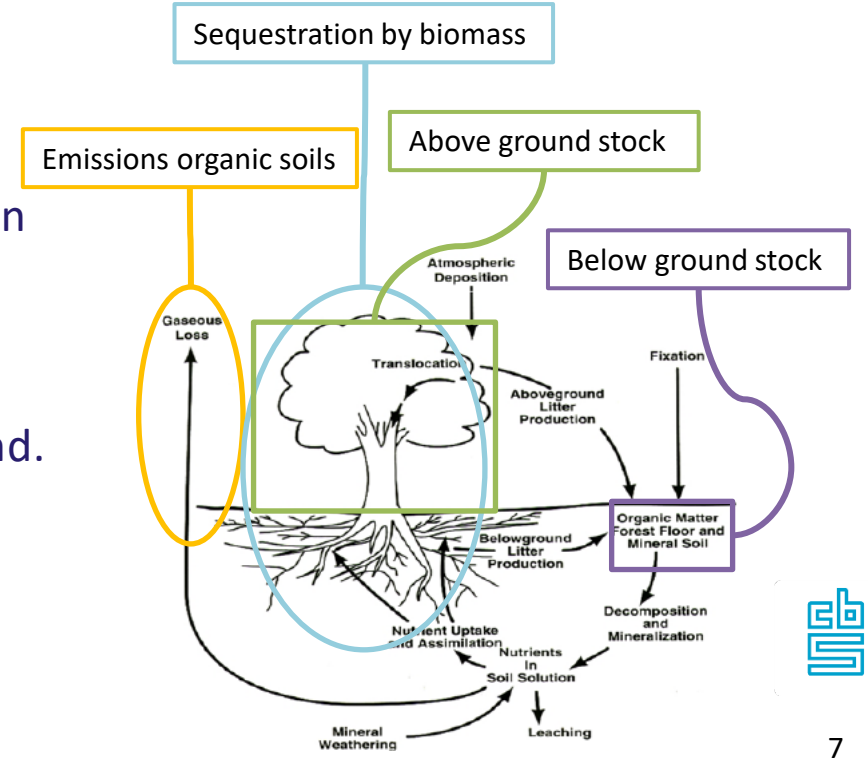
General structure



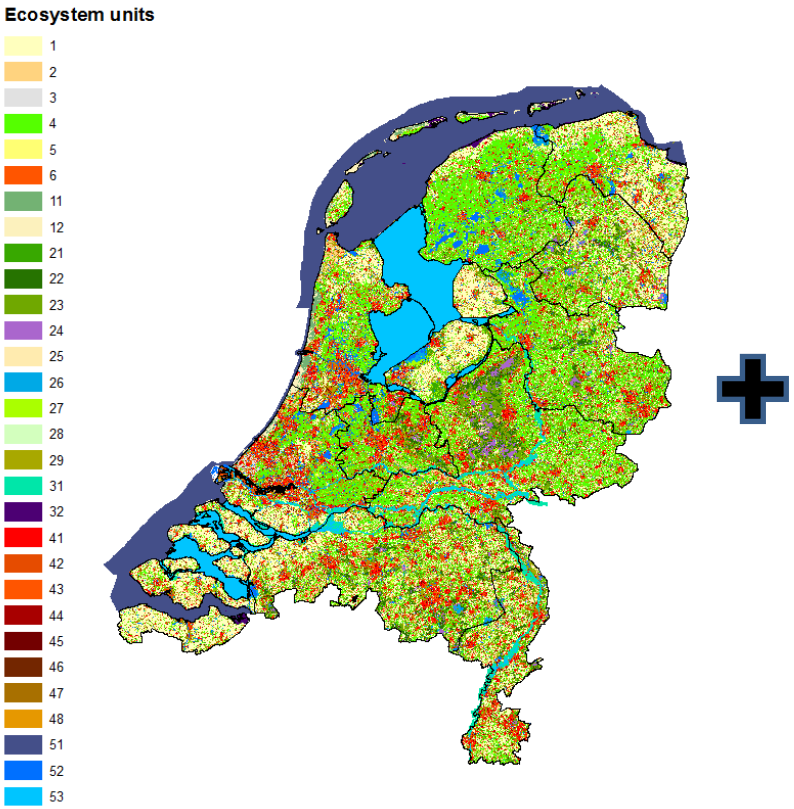
Biosphere

Biosphere

- Compiled together with Wageningen University (WUR).
- Biocarbon includes all organic carbon in the biosphere, i.e., carbon in living biomass and dead biomass.
- Carbon **stocks**: above and below ground.
- Carbon **flows**: timber harvest, carbon sequestration and carbon emissions.



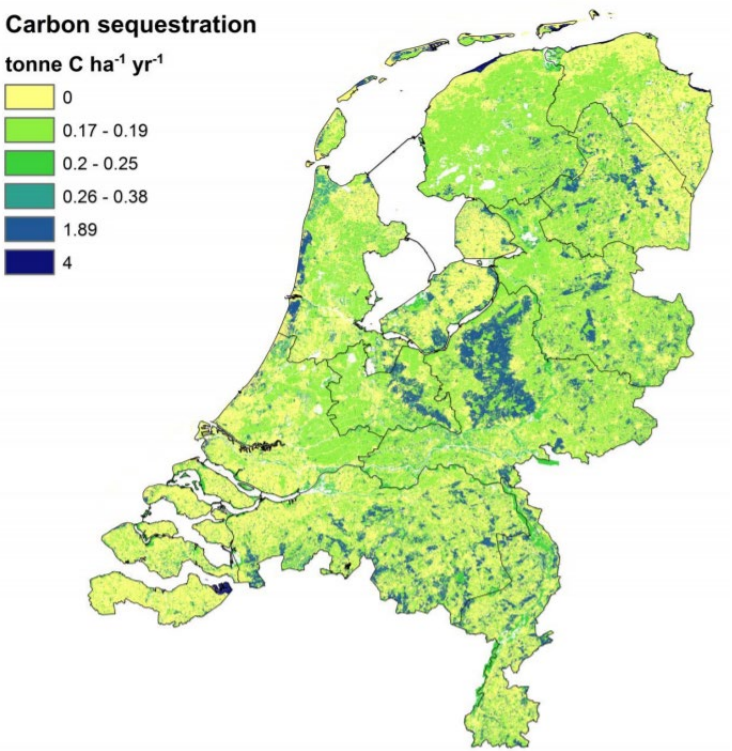
Data sources and methods

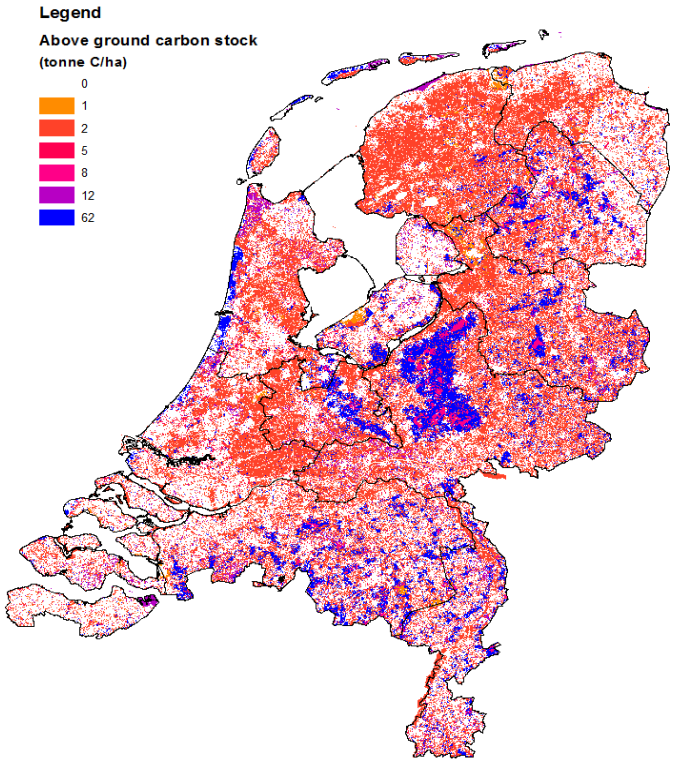


Look-up table carbon sequestration and stock

	Sequestration mean (ton C/ha/yr)	Sequestration high (ton C/ha/yr)	Stock (ton C/ ha)
Forest, deciduous	1.80	4.60	108.70
Forest, coniferous	0.50	2.20	59.80
Forest, mixed	1.10	3.30	89.40
Natural forest, deciduous	1.70	3.20	107.70
Natural forest, coniferous	0.80	1.90	62.80
Natural forest, mixed	1.40	2.60	92.40
Salt marsh	1.50	1.50	15.00
Bogs and lowland peat	0.22	0.22	1.60
Heath	0.19	0.19	13.00
Natural grassland	0.19	0.19	5.00
Temporary grassland	0.18	1.23	9.00
Grassland, permanent or extensive	0.18	0.73	9.00
Other grassland, field margins, tall herbs	0.18	0.18	9.00
Perennial crop	0.92	0.92	21.70
Annual crop	0	0	0
Beach, sand, coastal dunes	0	0	0
Fallow land	0	0	0
Built-up, infrastructure	0	0	0
Water	0	0	0

Spatial results





Geosphere

Geocarbon

- Carbon that is locked in the lithosphere, in either organic or mineral form.
- Data sources: geological surveys, energy statistics and research institutes.
- Compilation issues: economically extractable stock vs. total stock.

Mton C	Oil	Natural gas	Shale gas	Coal	Limestone	Total
Opening stock	32	394	94	12717		13237
Additions to stock						
Unmanaged expansion						
Managed expansion						
Discoveries						
Upwards reappraisals	1					1
Reclassifications						
Imports						
Reductions in stock						
Unmanaged contraction						
Managed contraction	1	17			0,1	18
Downwards reappraisals		237				237
Reclassifications						
Exports						
Net carbon balance	0	-254			-0,1	-254
Closing stock	32	140	94	12717		12983

Carbon in the economy

Carbon in the economy

Bitumen in roads

Waste dumps

Wood in construction works

Biobased materials in furniture

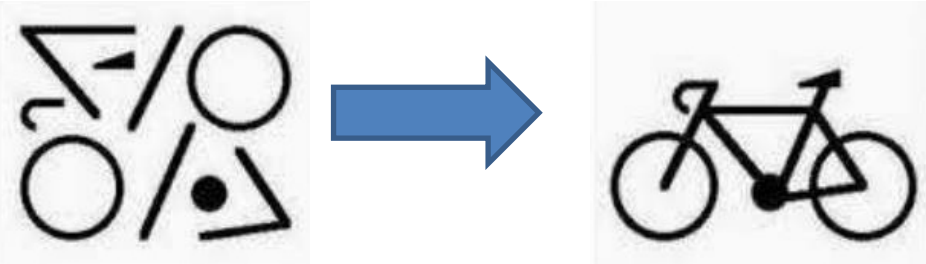
Data sources and methods

- Main data source: **Material Flow Monitor (MFM)**
- Additional sources: air emission accounts, water emission accounts, agricultural statistics, forest accounts, waste accounts, energy accounts.
- Combine with **carbon content coefficients** (C per kg of product group).
- Most **flows** of carbon in products are well know, however the **stocks** are not.

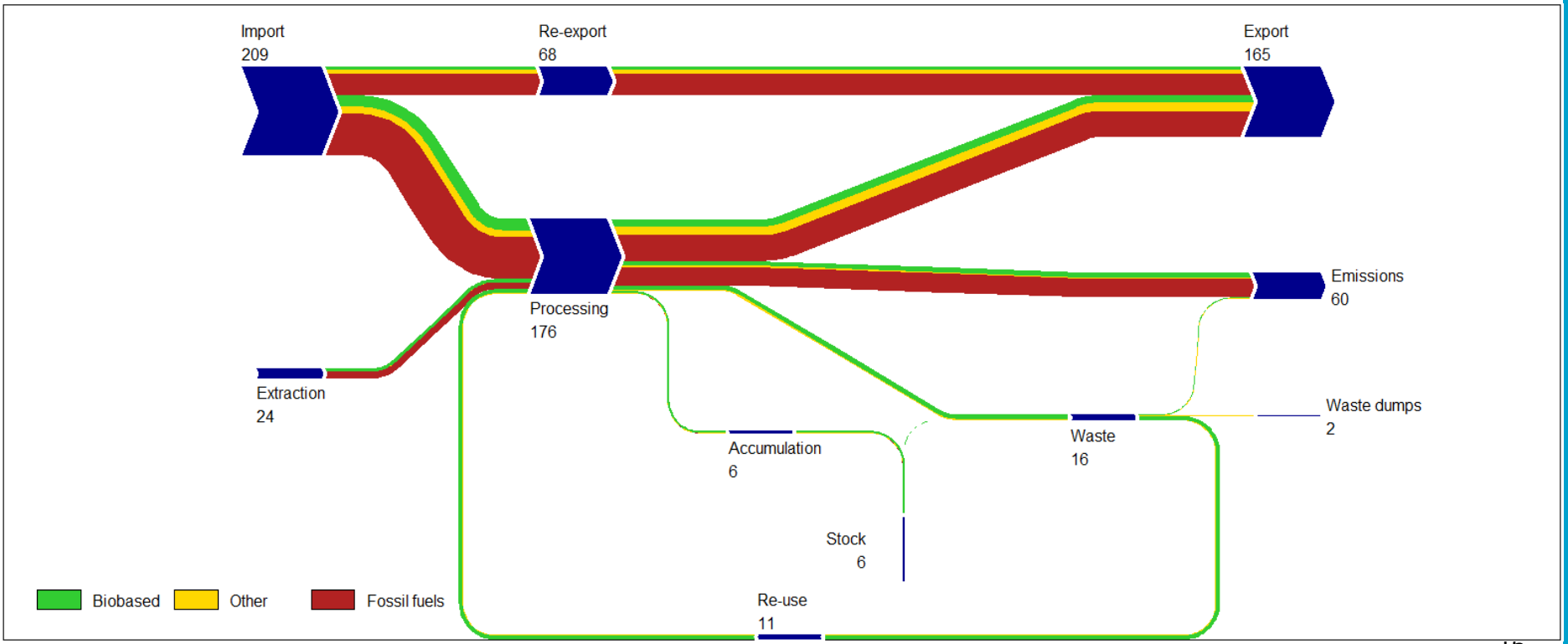
Material Flow Monitor (MFM)

- Supply and usage tables (SUT's) from euros to kilos:
  - 130 sectors, households, import, export and environment
  - 350 products, waste, extraction and CO2 emissions.

- Integration of different statistics: national accounts, international trade, energy statistics, extraction data, agriculture data, waste accounts and emission data.



Carbon in the Dutch economy in Mton C, 2018



Atmosphere

Atmosphere

- Additions to stock: emissions from economic activities

  ….but also emissions from respiration (humans and livestock) + emissions from soils (biocarbon).

- Reduction in stock: carbon sequestration.

- National carbon stock
  - *Cumulative C emissions since 1860.*

Carbon in the atmosphere in Mton C

Opening stock	3193.2
Additions to stock	
Short cyclic emissions diue to economic activities	5.1
Other emissions due to economic activities	51.0
Respiration of humans and livestock	6.3
Emissions from biocarbon (natural ecosystems)	1.8
Reductions in stock	
carbon sequestration in cultivated plants	8.5
carbon sequestration in biocarbon (natural ecosystems)	1.0
Net carbon balance	54.8
Closing stock	3248.0

Carbon account of the Netherlands, 2018

	Geocarbon						Biocarbon				Carbon in the economy				Carbon in the atmosphere	Total
Mton C	Crude oil	Natural gas	Shale gas	Coal	Limestone	**Total geocarbon**	Forests	Cropland / meadows	Other ecosystems	**Total biocarbon**	Inventories	Fixed assets, cosumer durables	Waste	**Total in the economy**	**Total in the atmpshere**	
Opening stock	32	394	94	12717		**13238**	61	203	106	**370**	20	0	0	**20**	**3094**	**16721**
																0
Additions to stock	1	0				**1**	1	7	0,2	**9**	245	3	22	**270**	**62**	**342**
Unmanaged expansion							1	0,2	0,2	**2**					**2**	**4**
Managed expansion								7		**7**	24			**24**	**60**	**91**
Discoveries	0	0		0		**0**										**0**
Upwards reappraisals	1	0		0		**1**										**1**
Reclassifications											21	3	13	**37**		**37**
Imports											201		8	**209**		**209**
																0
Reductions in stock	1	254		0	0,1	**255**	1,0	8	0,6	**10**	242	1	20	**263**	**9**	**536**
Unmanaged contraction							0,1	1	0,6	**2**					**2**	**4**
Managed contraction	1	17		0	0,1	**18**	0,9	7		**8**	58		3	**60**	**7**	**93**
Downwards reappraisals	0	237		0		**237**										**237**
Reclassifications											25	1	11	**37**		**37**
Exports											159		6	**165**		**165**
																0
Net carbon balance	0	-254		0	-0,1	**-254**	0,3	-1	-0,4	**-1**	3	2	2	**7**	**54**	**-194**
																0
Closing stock	32	140	94	12717		**12984**	61	202	105	**369**	23			**27**	**3148**	**16527**

Policy applications and future work

Policy relevance

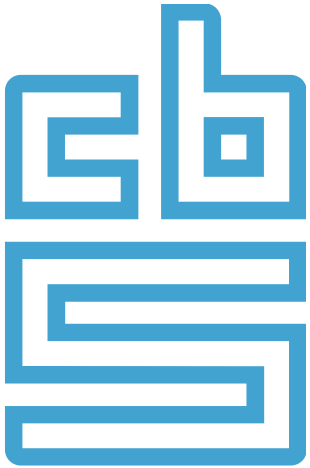
1. **Measuring progress** and support specific policy actions in the field of climate change mitigation.

2. The ecosystem part of the carbon account (i.e. biocarbon) is **spatially explicit**. This facilitates **climate action by provincial and local stakeholders**.

3. Measuring progress towards a **circular economy** and a **low-carbon economy**.

Issues and future work

- Data gaps:
  - Carbon stocks in the economy.
  - “Carbon content coefficients” for specific goods.
  - Geocarbon: potential vs. retrievable stock.
- Carbon in the seas/oceans.
- Further integration of environmental accounts (e.g. Forest Accounts).
- Develop indicators for policy use.



Facts that matter