System of Environmental Economic Accounting

Introduction to water accounting

Bram Edens, Ph.D.
Environmental-Economic Accounts Section
United Nations Statistics Division

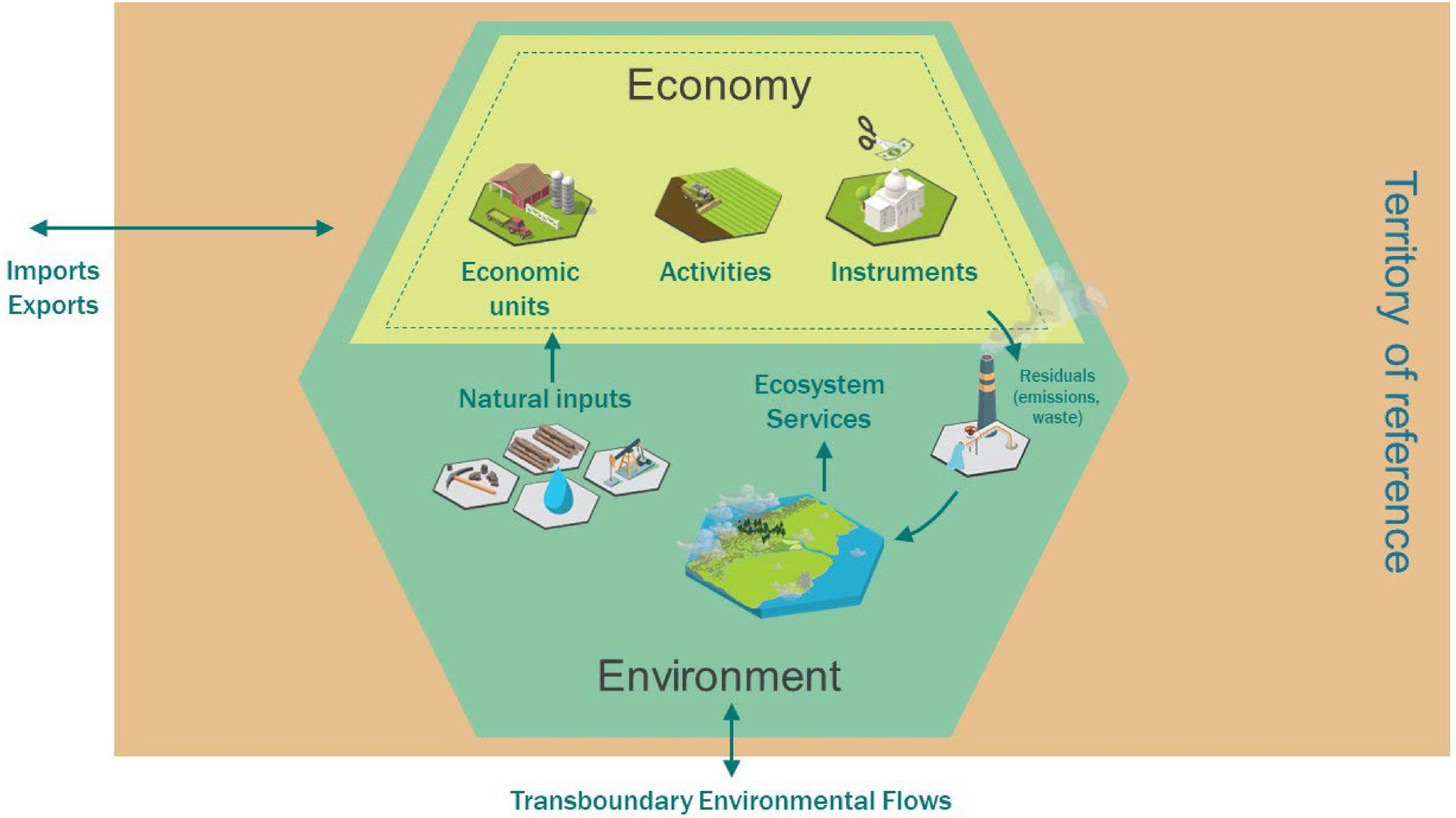
United Nations

The Need for Natural Capital Accounting

- Our economy + well-being crucially depends on nature
- Economy also impacts nature through depletion and degradation
- Both aspects (dependencies + impacts) not well reflected in GDP or the SNA
- Decision makers need key information necessary to effectively pursue sustainable development
- **System of Environmental Economic Accounting** (SEEA) developed to address these shortcomings
- SEEA integrates information on the economy and the environment showing their interrelationship complementing the System of National Accounts

SEEA

The Environment Economy Nexus



Main types of water accounts

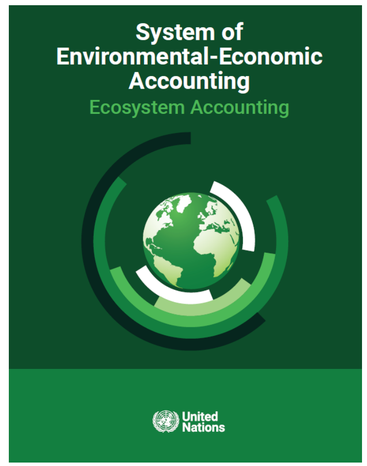
<u>SEEA Central Framework</u>

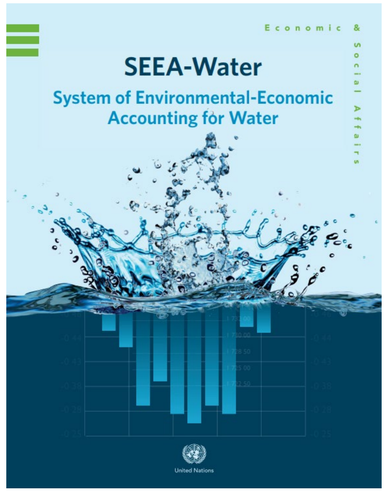
- Asset accounts
- **Physical water supply and use tables (PSUTs)**
- Emission accounts
- **Hybrid and economic accounts**

<u>SEEA Ecosystem accounts</u>

- Extent accounts (freshwater / marine ecosystem types)
- **Condition accounts**
- Ecosystem services (e.g. water flow regulation)

Monetary valuation





SEEA

Use table in 2020 in the Netherlands

Million m3	Agriculture, forestry and fishing	Mining and quarrying	Manufac-turing industry	Energy sector	Water collection, treatment and supply	Private waste-water treatment	Waste management services	Construction	Public waste-water treatment	Services	Households	Accumu-lation	Export	Environment	Total use
	A	B	C	D	E36	E37	E38-39	F	O84.1	G-U*					
(I) Water flows from environment to economy	**372,2**	**29,4**	**3.089,8**	**8.742,5**	**1.333,5**	**1,0**	**721,9**	**45,0**	**897,6**	**47,0**	**0,0**				**15.279,9**
Inland water resources	307,2	2,7	2.420,8	3.520,6	1.333,5	1,0	720,3	45,0	380,2	47,0	0,0				8.778,3
Groundwater	214,2	0,3	113,2	0,3	839,8	0,2	3,1	45,0	380,2	47,0	0,0				1.643,3
Soil water	-														-
Surface water	93,0	2,4	2.307,6	3.520,3	493,7	0,8	717,2	0,0	0,0	0,0	0,0				7.135,0
Other water sources	65,0	26,7	669,0	5.221,9	0,0	0,0	1,6	0,0	517,4	0,0	0,0				6.501,6
Precipitation	65,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	517,4	0,0	0,0				582,4
Sea water	0,0	26,7	669,0	5.221,9	0,0	0,0	1,6	0,0	0,0	0,0					5.919,2
(II) Abstracted water	**414,1**	**31,7**	**3.293,7**	**8.753,0**	**116,7**	**3,0**	**726,7**	**47,8**	**903,2**	**148,5**	**855,3**		**2,0**		**15.295,7**
Distribution	41,9	2,3	209,0	10,5	8,0	2,0	4,8	2,8	5,6	101,5	855,3		2,0		1.245,7
Drinkingwater	41,9	2,3	140,1	2,6	8,0	2,0	4,5	2,8	5,6	101,5	855,3		2,0		1.168,6
Industry water	0,0	0,0	68,9	7,9	0,0	0,0	0,3	0,0	0,0	0,0	0,0		0,0		77,1
Own use	372,2	29,4	3.084,7	8.742,5	108,7	1,0	721,9	45,0	897,6	47,0	0,0		0,0		14.050,0
Aquaculture	0,0														0,0
Cooling (fresh water)		2,2	2.126,8	3.168,3			646,9	0,0							5.944,2
Cooling (seawater)	0,0	26,7	669,0	5.221,9	0,0		1,6	0,0		0,0					5.919,2
Hydroelectric power generation				0,0											0,0
Irrigation	333,5									0,0	0,0				333,5
Mine water		0,0													0,0
Other uses	38,7	0,5	288,9	352,3	108,7	1,0	73,4	45,0	897,6	47,0	0,0				1.853,1
(III) Wastewater flows within the economy	**0,0**	**0,0**	**9,9**	**0,0**	**0,0**	**3,4**	**1,1**	**0,0**	**1.055,0**	**0,7**	**0,0**		**0,0**		**1.070,1**
Reuse	0,0	0,0	2,3	0,0	0,0	0,0	1,0	0,0	0,0	0,4	0,0				3,7
Wastewater	0,0	0,0	7,5	0,0	0,0	3,4	0,1	0,0	1.055,0	0,3	0,0		0,0		1.066,3
Own treatment	0,0	0,0	7,5	0,0	0,0	0,0	0,1	0,0	0,0	0,3	0,0				7,9
Wastewater (to) treatment					0,0	3,4			1.055,0				0,0		1.058,4
(IV) Return flows of water														**14.458,7**	**14.458,7**
To inland water resources														6.466,6	6.466,6
Groundwater (+soil water)														333,5	333,5
Surface water														6.133,1	6.133,1
To other sources**														7.992,1	7.992,1
(V) Evapotranspiration and water in products												-	**12,0**	-	**836,1**
Total of Use table	**786,3**	**61,1**	**6.393,4**	**17.495,5**	**1.450,2**	**7,4**	**1.449,7**	**92,8**	**2.855,8**	**196,2**	**855,3**	-	**14,0**		

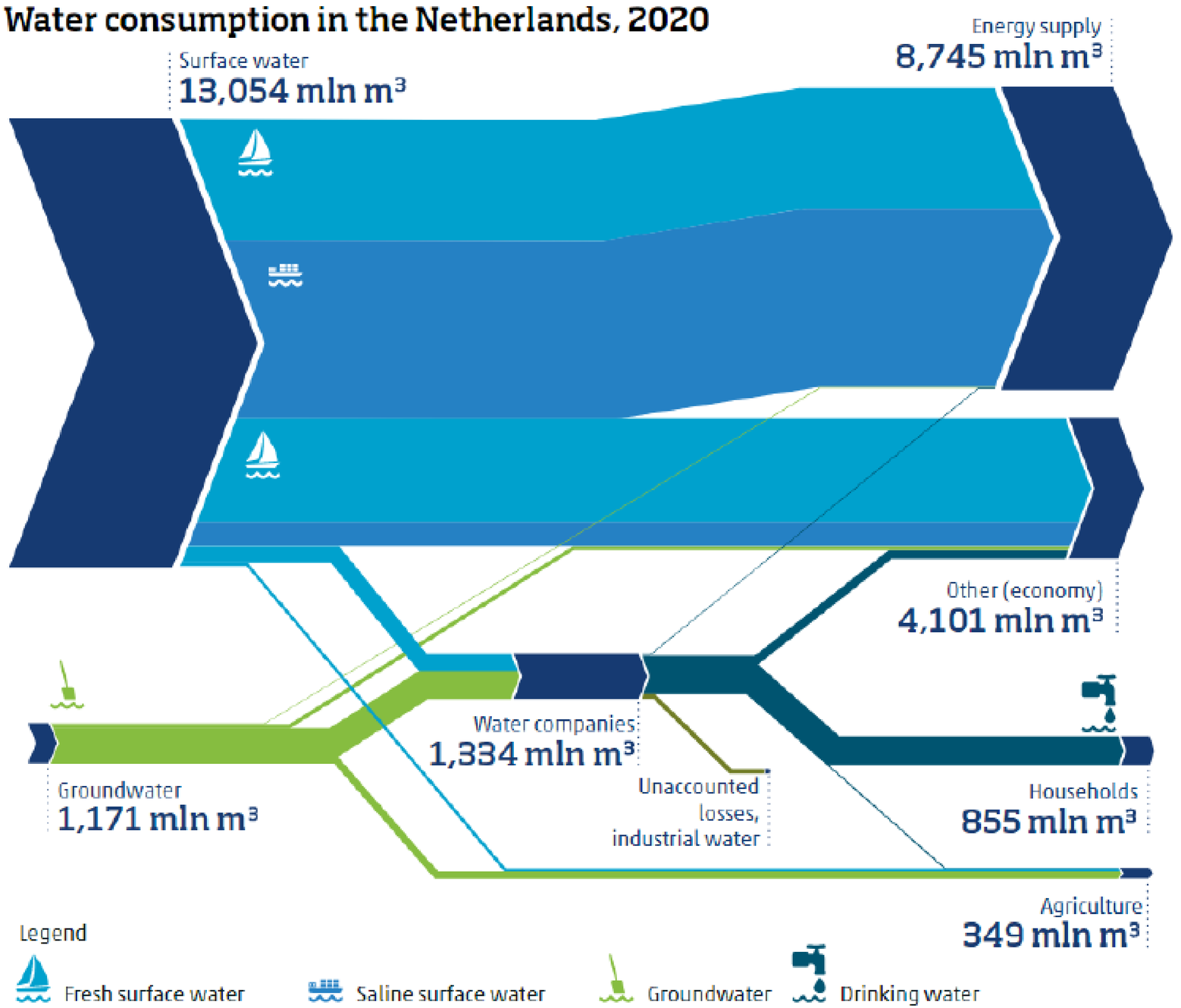
**excluding O84.1*

***including returns with unknown destination*

Source: Statistics Netherlands, UNECE-OECD conference on SEEA Implementation 2023

Example Netherlands

- Visual presentation of the physical supply and use table
  - > Water flows in the Netherlands in 2020
  - > From different sources
- Accounts used by Ministry of infrastructure and Water Management to report on the EU Water Framework Directive every three years



Source: Statistics Netherlands, UNECE-OECD conference on SEEA Implementation 2023

SEEA

Example Brazil – hybrid account

Intensity of water consumption (liters/R$)

Brazil

Economic activities	2013	2014	2015	2016	2017
Agriculture, forestry, and fishing	1,324.9	1,265.0	1,290.2	1,053.8	1,060.5
Agriculture, forestry, and fishing (1)	104.9	108.9	109.5	95.5	95.5
Extractive industries	1.4	1.5	2.5	5.2	3.4
Manufacturing industries and construction	4.4	3.9	3.6	3.4	3.4
Electricity and gas	1.5	1.8	1.2	0.8	0.7
Other activities	0.2	0.1	0.1	0.1	0.1

Sources: 1. IBGE. 2. Agência Nacional de Águas - ANA.

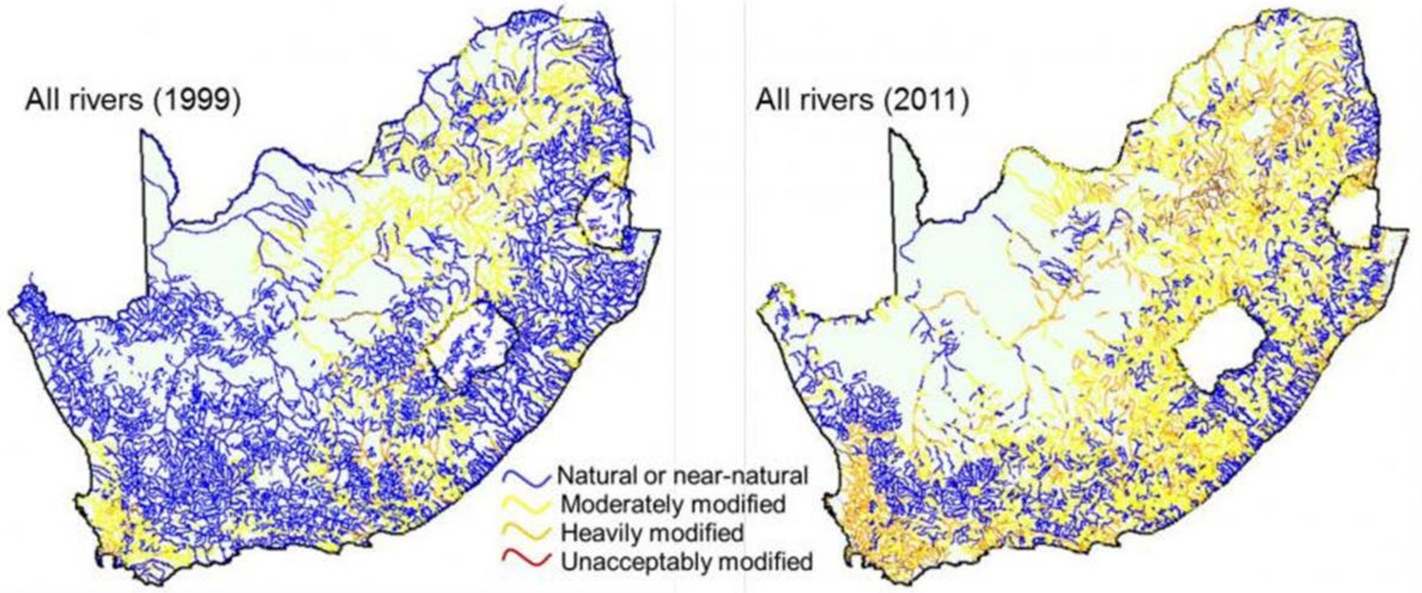
(1) Without soil water.

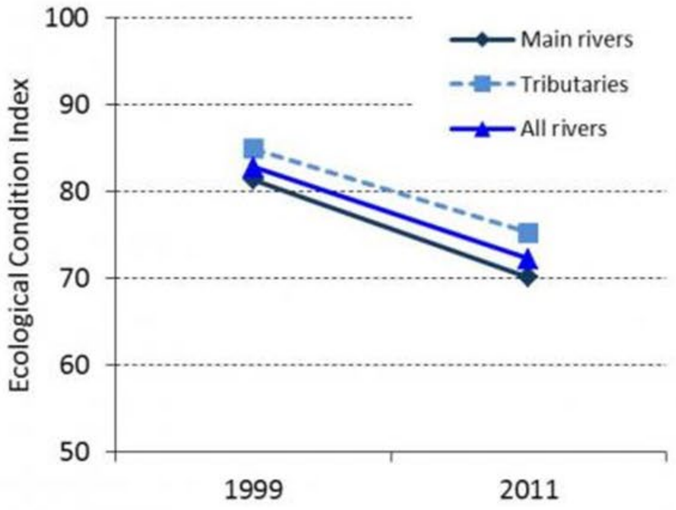
Source: IBGE 2018

https://biblioteca.ibge.gov.br/visualizacao/livros/liv101741_informativo.pdf

Example South Africa - ecosystem condition

- South Africa is water-scarce country
- Water ecosystems critical to providing a reliable supply of clean water
- In 2014 piloted accounts for river ecosystems
- Policy use:
  - > Inform National Water and Sanitation Master Plan -> highlights importance of maintaining integrity of freshwater ecosystems as part of water value chain
  - > Accounts have identified areas of decline in river health so that solutions can be identified and targeted to better manage catchments





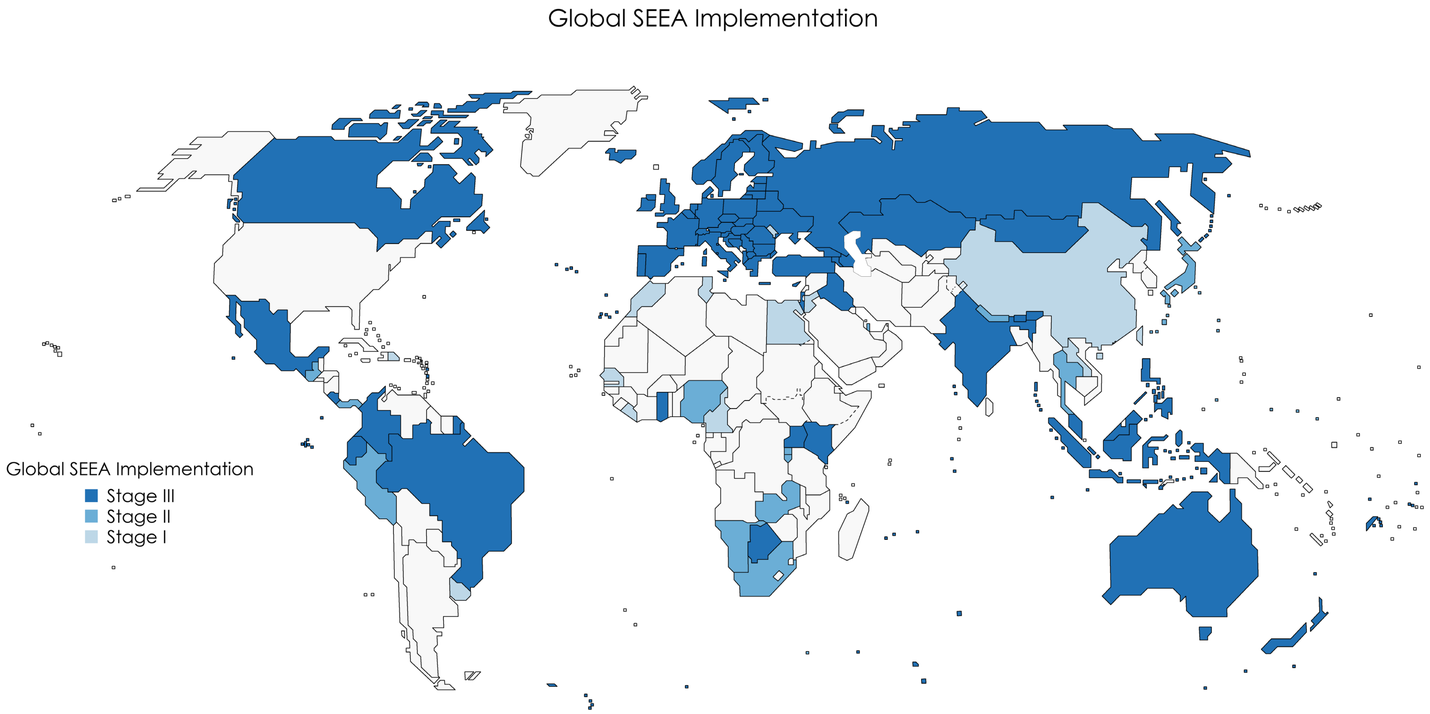
Overall
10% decline
in ecological condition of rivers
1999 - 2011

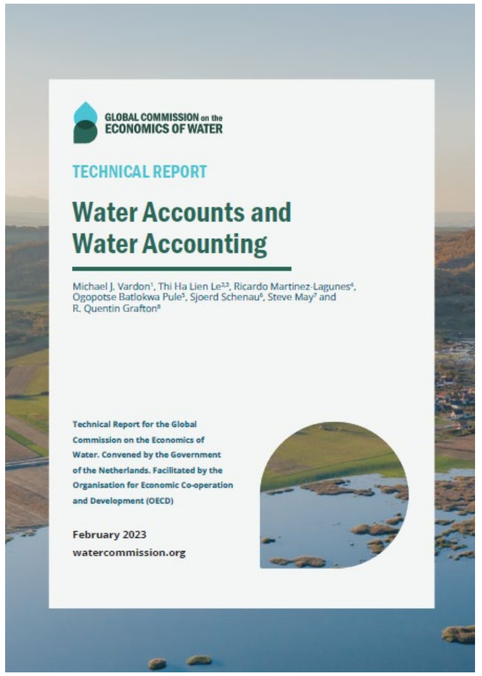
Source: Presentation by Mandy Driver, SANBI at Third Forum on Natural Capital Accounting for Policy D

SEEA

SEEA implementation

- According to 2022 Global Assessment we have 92 countries compiling SEEA
- 42 countries compiling water accounts





Detailed review:

This technical report provides a foundation for water accounts and water accounting. It explains why water accounting is important and, with multiple examples, shows how water accounting is a key information tool needed by all water decision makers.

[Water Accounts and Water Accounting – Global Commission on the Economics of Water (watercommission.org)]

Conclusions

- There is an increasing number of countries implementing SEEA + water accounts
- There are various types of water accounts, supporting a diverse range of policies
- Provides framework for deriving indicators to support various monitoring and reporting frameworks
- Most commonly compiled (water) accounts are in physical units
- Standardization is important to obtain high-quality, and comparable statistics
- Water accounting due its multi-disciplinary nature catalyzes collaboration between different stakeholders (statistical office, universities, line ministries, etc.)

THANK YOU

seea@un.org // https://seea.un.org/