



System of
Environmental
Economic
Accounting

SEEA Water Accounting & Informed decision making

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(on behalf of UNSD - SEEA team & CBS - EA team)

26-08-2018

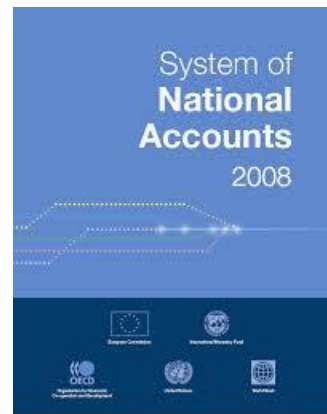


United Nations

Outline

- Introduction
- National Accounts (SNA)
- Environmental-economic accounting (SEEA)
- SEEA - Water accounts
 - What they are
 - Why account for water
 - Schematics
 - Accounting tables
 - Indicators
- Water Accounts & Policy application

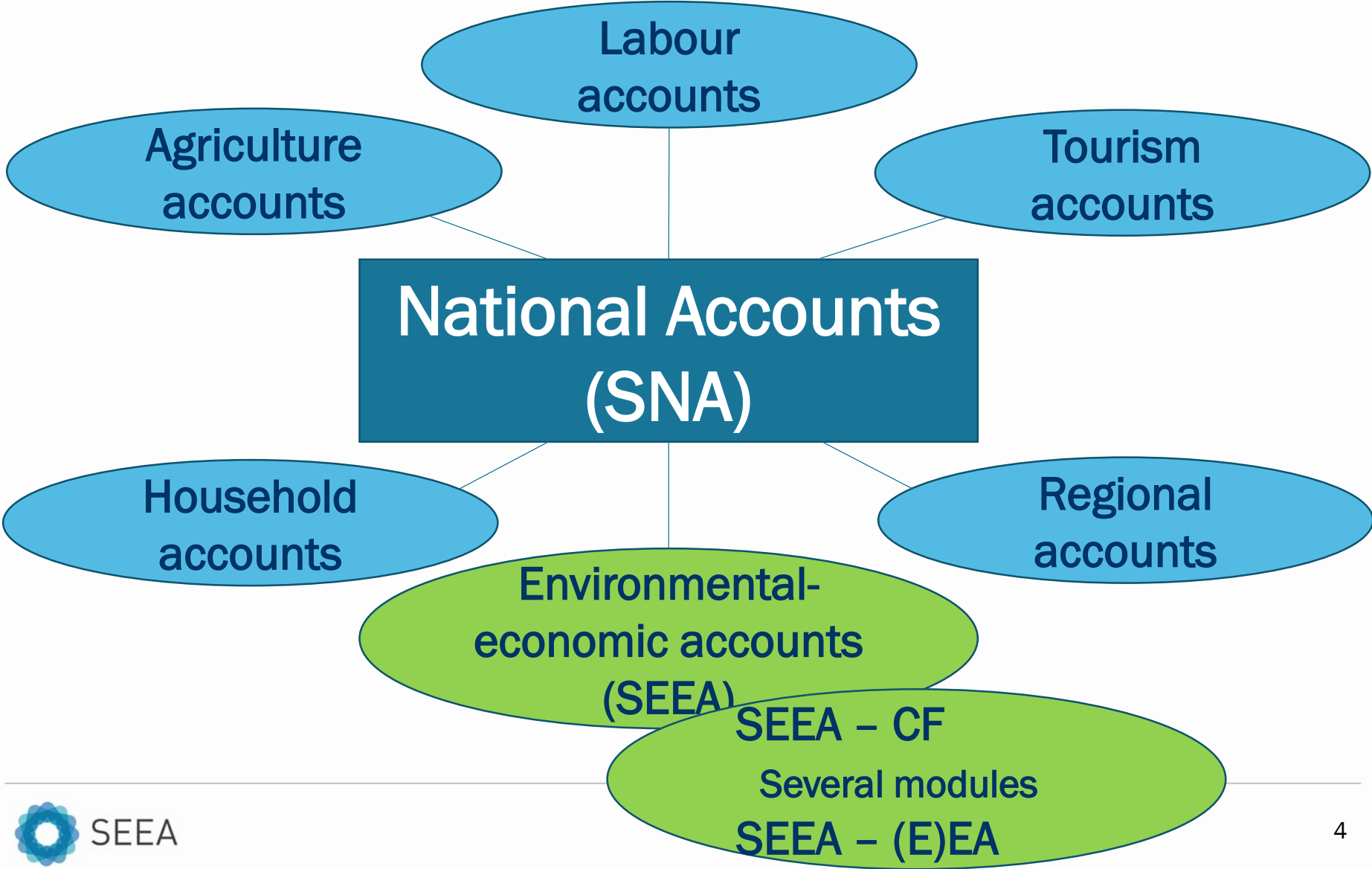
System of National Accounts (SNA)



The SNA:

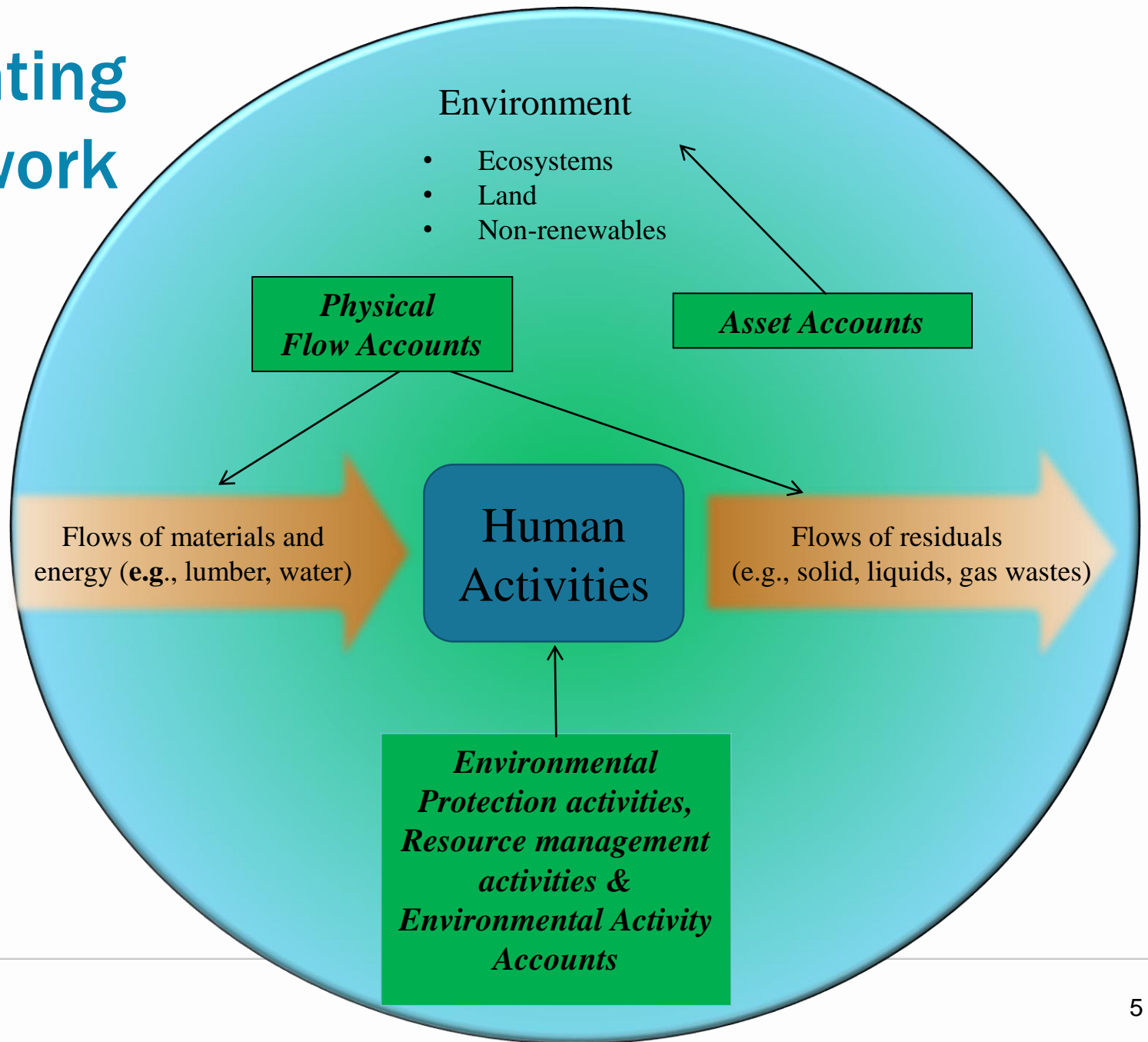
- Framework to organize economic data at country level
- Statistical understanding of economic relationships
 - e.g. between production, income, expenditure and accumulation
- Imposes order on underlying data
 - Definitions and classifications: industry, sector and commodity (product)
- Provides macro-economic indicators, e.g. GDP, VA, etc.
- Supports economic forecasting and future-oriented decision making
- Key information source for government & society
- International statistical standard

Satellite accounts to NA



Accounting framework

SEEA:



SEEA - Water Accounting

What is SEEA – Water ?

Water accounting is a way to provide detailed data on all water stocks, sources, users, and their related ecosystems.

In [SEEA-CF](#), the Water Accounts *are displayed* in a spatially-detailed version that captures inter-ecosystem flows of water ([SEEA-EEA](#), Section 4.62), water quality, and supply/use for ecosystems and for economic supply/use.

It is important to note that water is also an **ecosystem service** i.e. shown as clean (ground) water requires less treatment to use. Water systems also provide filtration and water regulation services.

Note the SEEA-EEA water account aligns on existing SEEA-CF water account. It also includes water quality, and ecosystems as users.

SEEA-CF

System of Environmental Economic Accounting - Central Framework

SEEA-EEA

System of Environmental Economic Accounting – Experimental Ecosystem Accounting

Water Accounting

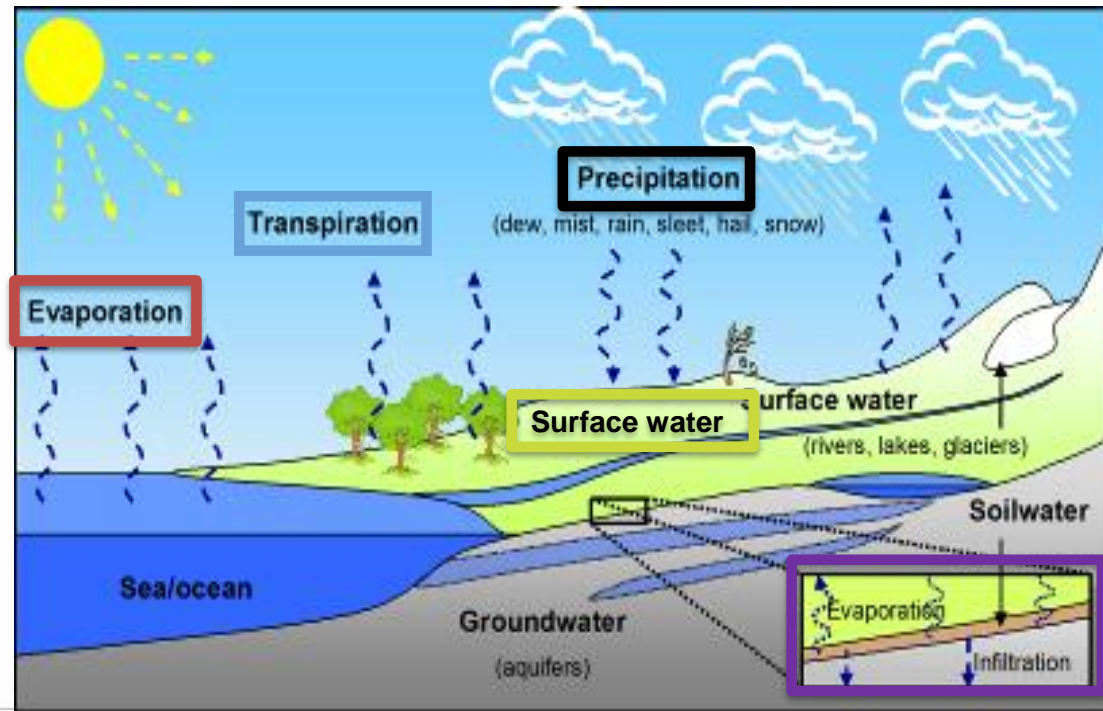
Concepts – Water Cycle

There are two general **concepts** to be considered in the **water accounts**:

- **water cycle**
- **water stocks, supply, abstraction, and use**

The **first concept** addresses the water cycle, or **hydrological cycle**. The main components are:

- Water storage in sea/oceans
- Evaporation
- Sublimation
- Transpiration
- Water in the atmosphere
- Precipitation (dew, mist, rain, sleet, hail, snow)
- Infiltration
- Water storage in ground, lakes, and glaciers.



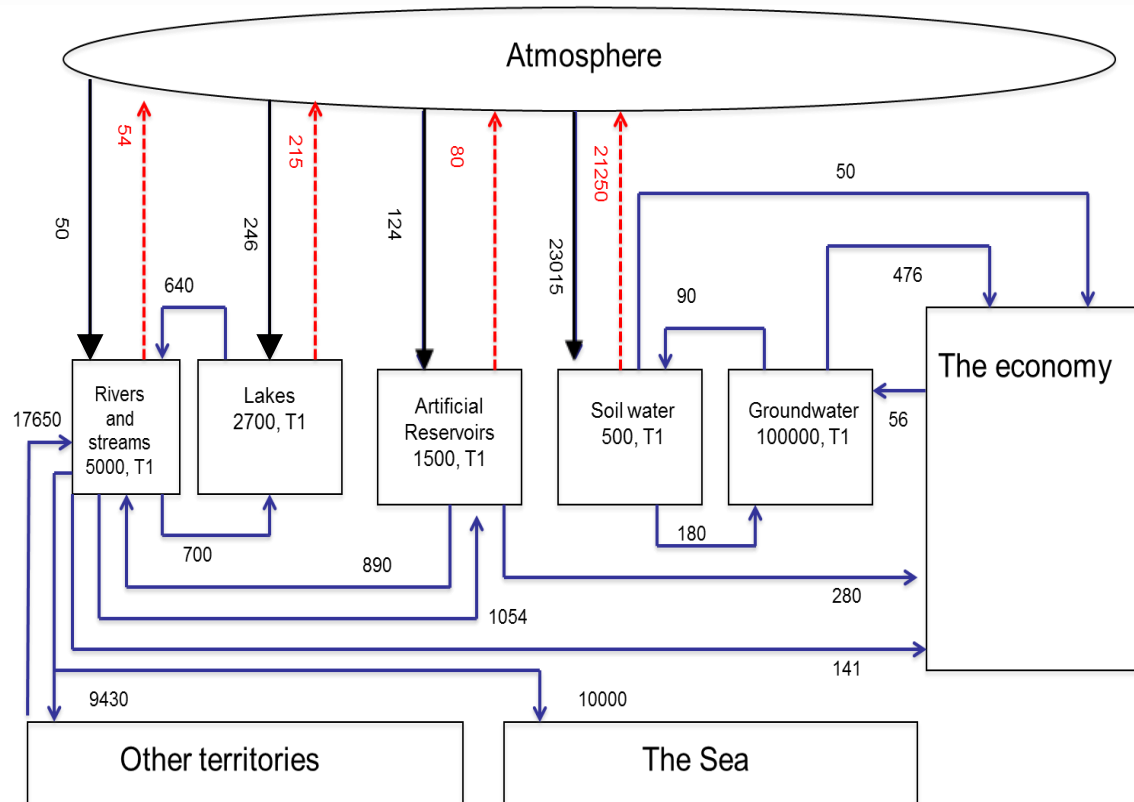
Water Accounting – Compilation (1)

Concepts – Water Stocks & Flows

The **second concept** for water accounting addresses water stocks, abstraction, supply and use.

Water stocks and flows diagram
The concept codifies all the flows of water in a stock and flow diagram. It shows amounts in mln (m³) transferred from one sphere to another. The direction of the arrows shows the direction of the flow.

Water Stocks and Flows Diagram



Losses from inland water system
Additions to inland water system
Transfers within inland water & WA



Water Accounting – Compilation (2)

Concepts – Water Stocks & Flows

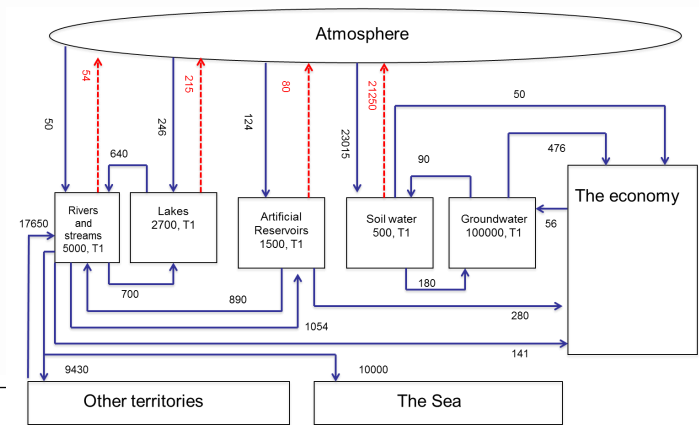
For the **second concept** for water accounting:

After examining the **flow diagram**,

One has to transfer the quantities of additions, reductions, and transfers into a **water asset account table**.

The **water asset account table** contains opening and closing stocks for each type of water resource. In addition, it can illustrate the amount of water additions and reductions for each type.

Water Stocks and Flows Diagram



	Type of water resources						Total
	Artificial reservoirs	Lakes	Rivers and streams	Surface water		Groundwater	
Glaciers, snow and ice							
(A) Opening stock	1,500	2,700	5,000	-	100,000	500	109,700
Additions to stock							
(B) Returns (from Economy)	-	-	-	-	56	-	56
(C) Precipitation	124	246	50	-	-	23,015	23,435
(D) Inflows from other territories	-	-	17,650	-	-	-	17,650
(E) Inflows from other inland water	1,054	700	640	-	180	90	2,664
(F) Discoveries of water in aquifers	-	-	-	-	-	-	-
(G) Total additions to stock	1,178	946	18,340	-	236	23,105	43,805
Reductions in stock							
(H) Abstraction (to Economy)	280	-	141	-	476	50	947
(I) Evaporation and evapotranspiration	80	215	54	-	-	21,250	21,599
(J) Outflows to other territories	-	-	9,430	-	-	-	9,430
(K) Outflows to the sea	-	-	10,000	-	-	-	10,000
(L) Outflows to other inland water	890	640	1,754	-	90	180	3,554
(M) Total reductions in stock	1,250	855	21,379	-	566	21,480	45,530
Closing stock	1,428	1,961	1,961	-	99,670	2,125	107,975



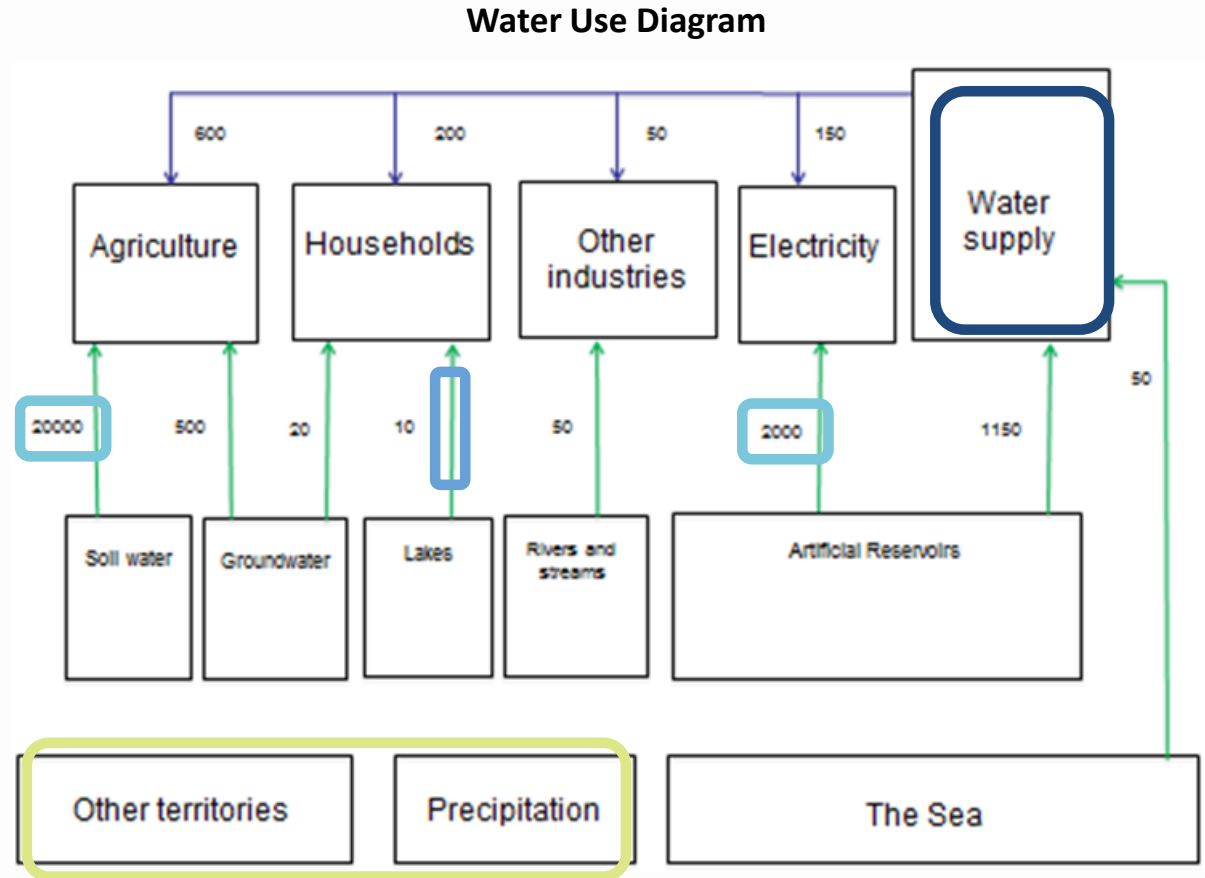
Water Accounting – Compilation (3)

Concepts – Water Stocks & Flows

In a similar process one can take a **water use diagram** and create a **physical water use table** from it.

The **water use diagram** shows the different suppliers/ users/ of water and the flows of water among them.

All flows shown are included in the SEEA Water - Physical Supply and Use Table (**PSUT**).



The **blue arrows** represent **water produced** →

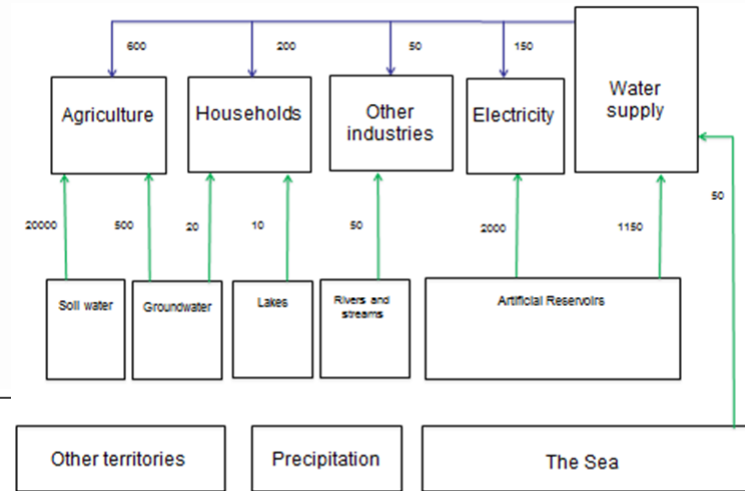
The **green arrows** represent the **water provisioning service** →

Water Accounting – Compilation (4)

Concepts – Water Stocks & Flows

After examining the **water use diagram**, one can transfer the water flow values for users and providers into additions, reductions, and transfers in a **physical water use table**.

Water Use Diagram



	Use of water					Total use
	Agriculture, forestry and fishing	Electricity, gas, steam and air conditioning	Water collection, treatment and supply	Other industries	Households	
Sources of abstracted water						
Inland water resources						
Surface water	-	2,000	1,150	50	10	3,210
Groundwater	500	-	-	-	20	520
Soil water	20,000	-	-	-	-	20,000
Sea water	-	-	50	-	-	50
Total abstracted water	20,500	2,000	1,200	50	30	23,780
Abstracted water						
Distributed water (to other economic units)	-	-	1,000	-	-	
Use of water (from other economic units)	600	150	-	50	200	1,000
Own use	20,500	2,000	200	50	30	22,780
Total use of water (abstracted and distributed water)	21,100	2,150	200	100	230	23,780



Indicators

Water:

- Access
- Use / capita OR / GDP and VA
- Supply rates
- Availability (per capita & by type)
- Productivity & use efficiency (SDG-6.4)
- Water Emissions / GDP or / capita
- Water stress (SDG-6.4)
- SDG 6 – Indicators (& overlapping SDGs)

Ecosystem Services and Natural Capital

- **Natural capital:** mineral reserves (oil, gas, minerals) and renewable natural capital (ecosystems, land and water)
- **Ecosystem services:** contribution of ecosystems to the economy and social benefits
- **Several pilot projects:** by NSI's & partners to develop EEA – type of accounts for a comprehensive set of ecosystem services



Source: PBL, RIVM, WUR, CICES 2014

Ecosystem Accounts (biotic and abiotic services)

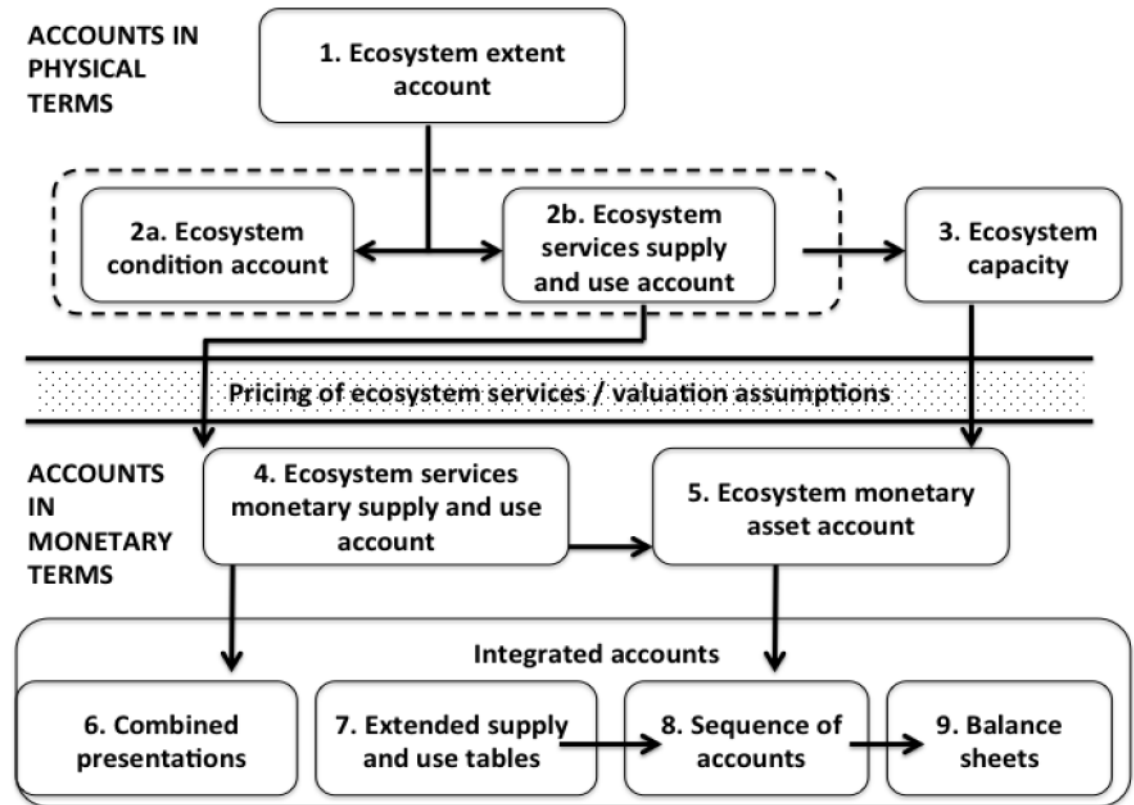
Carbon Account

Water Account

Land Account

Biodiversity Account

Figure 4.1 Connections between ecosystem accounts



Source: SEEA – EEA Revision 2017

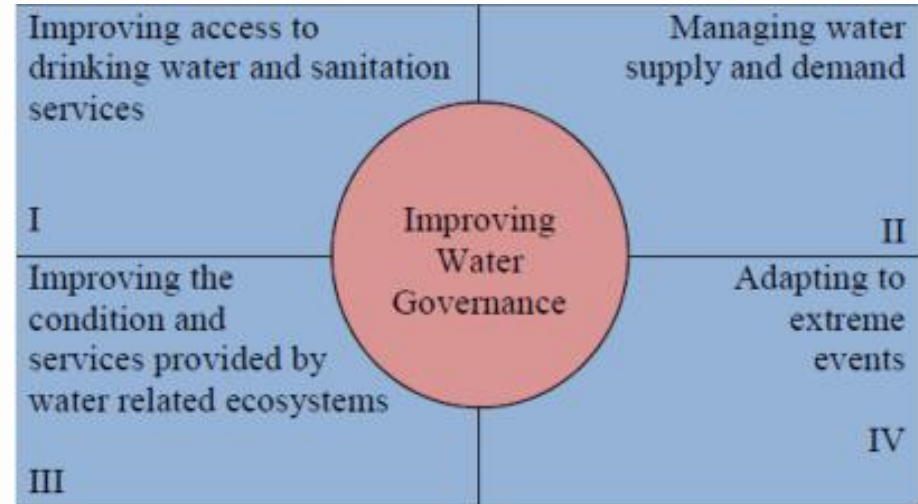
Water Accounting

Water Policy Issues and Ecosystems

For water accounts, ecosystem accounting is relevant for all four (4) areas of water policy that improve water governance.

The four (4) areas of water policy are:

- I. Improving access to drinking water and sanitation services
- II. Managing water supply and demand
- III. Improving the condition and services provided by water related ecosystems
- IV. Adapting to extreme events



Thank you

Questions?

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Environmental Accounts (SEEA-CF) modules

1. Physical flow accounts

- Energy accounts, *Water flow accounts*, Material flow accounts,
- Air emission accounts, *Water emission accounts*, Waste accounts, etc.

2. Asset accounts (opening, closing stocks & additions, reductions)

- Land accounts
- Energy asset / subsoil accounts for natural gas and crude oil
- Forest asset accounts (timber flows), Fish accounts
- *Water asset accounts*, etc.

3. Monetary accounts

- Environmental protection expenditure (incl. Resource Management expend.)
- Environmental taxes and subsidies
- Environmental goods and service sector
- Emission Trading (i.e. CO₂ – ETS), etc.

4. Combined physical and monetary accounts (Hybrid Accounts)

What is NCA ?

System of Environmental -Economic Accounting

NA: Pro	EA: Physical	Goods and				Ecosystem services
Agri	EA: Water Accounts (m3, l,)	Goods and services				Ecosystem services
Min	Agriculture, forestry, fisheries	Physical Units	Physical Units	Physical Units	Physical Units	P.U and \$
Mar	Mining	Physical Units	Physical Units	Physical Units	Physical Units	P.U and \$
Wat	Manufacturing	Physical Units	Physical Units	Physical Units	Physical Units	P.U and \$
Env	Water supply	Physical Units	Physical Units	Physical Units	Physical Units	P.U and \$
sec	Environmental sector	P.U and \$	P.U and \$	P.U and \$	P.U and \$	P.U and \$



International statistical standard

EXISTING:

The **SEEA – CF (Central Framework)** was adopted as an international statistical standard by the UN Statistical Commission in 2012

NEW & DEVELOPING:

The **SEEA – EEA (Experimental Ecosystem Accounting)** complements the SEEA Central Framework and represents international efforts toward coherent ecosystem accounting

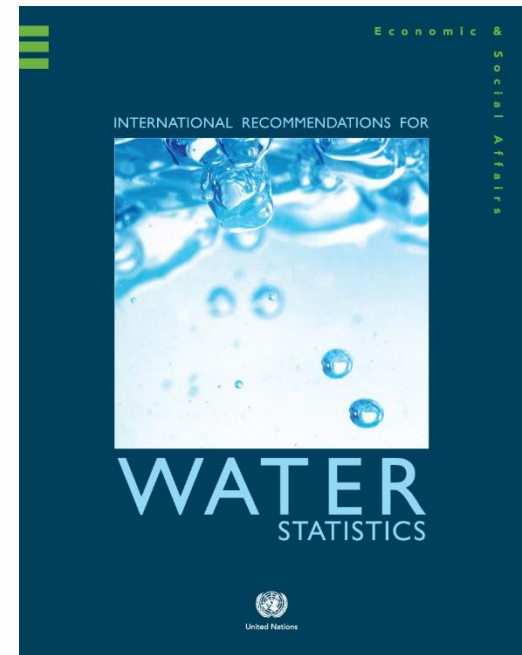
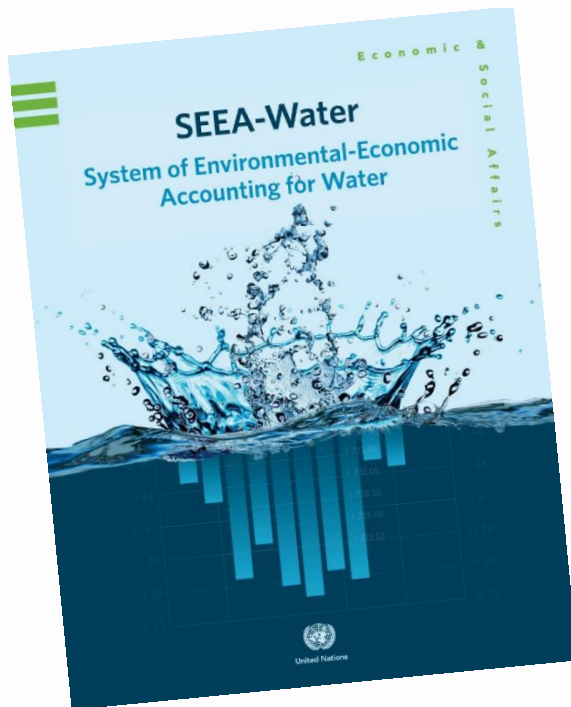


SEEA-Water - Structure

9 Chapters, 2 parts:

- Part 1
 - Ch. 1 Introduction
 - Ch. 2 Water Accounting Framework
 - Ch. 3 Physical Supply and Use Tables
 - Ch. 4 Emission Accounts
 - Ch. 5 Hybrid and Economic Accounts
 - Ch. 6 Asset Account
- Part II
 - Ch. 7 Quality Account
 - Ch. 8 Valuation
 - Ch. 9 Policy use

The SEEA-Water is a subsystem of the SEEA that covers the *physical and economic stocks and flows* associated with *water*. It also covers, to some extent, *emissions of pollutants and water quality*.



The International Recommendations for Water Statistics (IRWS) was designed to assist countries in the implementation of SEEA-Water. Guidelines are being developed to provide additional support.

The SEEA-Water and the IRWS provide the framework for developing information that is comprehensive, consistent, and comparable through time and space.



SEEA – EA Ecosystem Accounts: Water Accounting & Representation

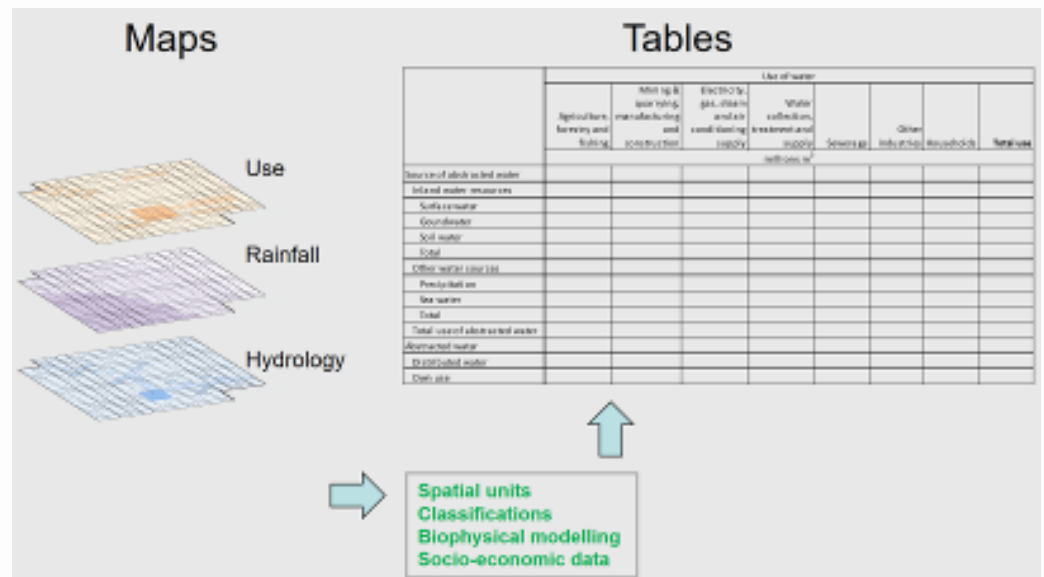
After the water cycle components are understood, **water accounts** can be represented using maps (extent) and tables that contain **spatial units, classifications, biophysical modelling, and socio-economic data**.

A corresponding water assets table would link these accounts to the ecosystem types that provide and use the water.

The water account spatially details data on:

- stock
- supply, and
- use including soil moisture & groundwater

In addition, the table illustrates water quality measures (and their contribution to **condition accounts**).



THANK YOU

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