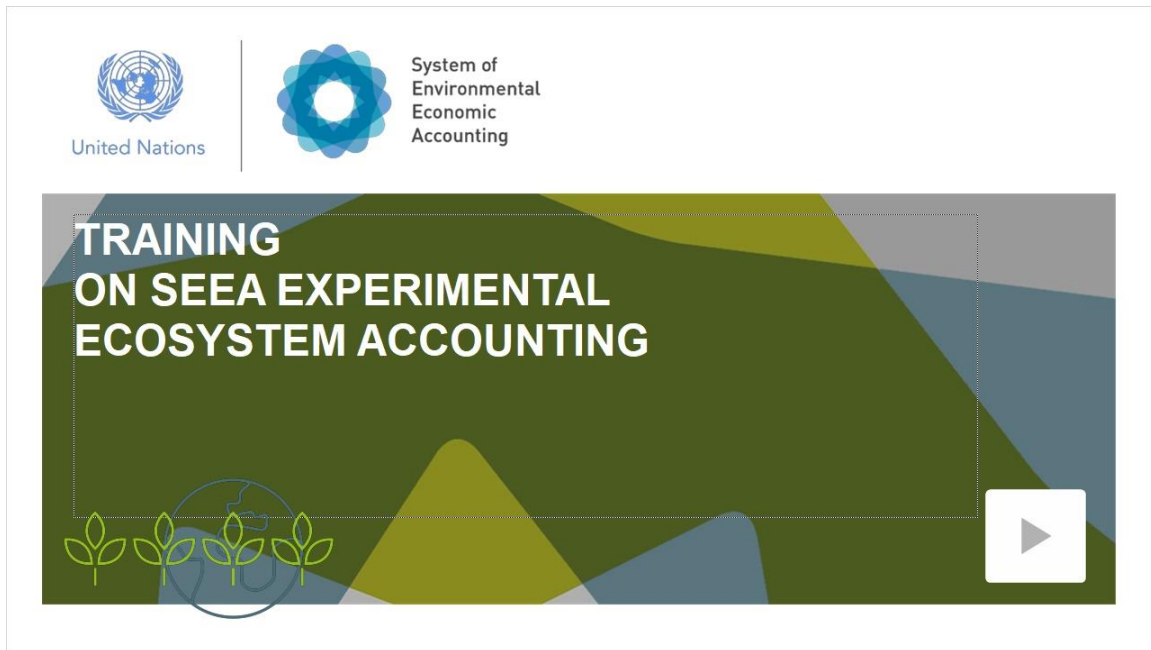


# SEEA\_EnvAcc\_M1\_EN

## 1. Module 1 - Introduction

### 1.1 Title page



Notes:

## 1.2 Untitled Slide

MODULE 1: BASIC CONCEPTS

Page 2 / 28

SEEA

### Welcome to the training on Experimental Ecosystem Accounting


Thank you for your interest in the training on Experimental Ecosystem Accounting.

The System of Environmental-Economic Accounting 2012–Experimental Ecosystem Accounting ([SEEA EEA](#)) was welcomed by the United Nations Statistical Commission in March 2013, as an important first step in the development of a statistical framework for ecosystem accounting. It encouraged its use by countries and organizations for further testing and experimentation.

The SEEA EEA was further complemented and in part updated in December 2017 by the “Technical Recommendations in support of the System of Environmental-Economic Accounting 2012–Experimental Ecosystem Accounting” ([white cover publication](#))

The training is primarily based on the Technical Recommendations.

This training is the product of long-term projects on Natural Capital Accounting and was developed in partnership with many international and regional organizations. Financial support was provided by the Norwegian Agency for Development Cooperation and the European Union.






## 1.3 Welcome


WELCOME

Page 3 / 28

SEEA

### Module 1: Key concepts





Notes:

## 1.4 Welcome

MODULE 1: BASIC CONCEPTS

Page 4 / 28 SEEA


### Welcome





... to the first module on Experimental Ecosystem Accounting!

This module is designed to introduce the key concepts of Ecosystem Accounting and will cover the following topics:

- Definition of ecosystem accounting
- Scope and purpose of ecosystem accounting
- The ecosystem accounting framework
- Types of ecosystem accounts and approaches to measurement
- Steps in compiling ecosystem accounts
- Valuation in ecosystem accounting

We appreciate your interest in accounting for the environment!





## 1.5 Definition of ecosystem accounting


MODULE 1: BASIC CONCEPTS




Page 5 / 28 SEEA

### Definition of ecosystem accounting

Ecosystem accounting is a coherent framework for integrating measures of ecosystems with measures of economic and other human activity, based on the following:

- It complements and builds on the accounting for environmental assets as described in the System of Environmental-Economic Accounting 2012–Central Framework ([SEEA CF](#)), which includes accounts for individual resources such as timber, soil and water.
- The accounting approach of the SEEA Experimental Ecosystem Accounting ([SEEA EEA](#)) recognizes that individual resources function together within a broader system; separate analyses of ecosystems and the economy do not adequately reflect the fundamental relationship between humans and the environment.
- Recently complemented with the “Technical Recommendations in support of the System of Environmental-Economic Accounting 2012–Experimental Ecosystem Accounting” published in December 2017 as [white cover publication](#). This training is based on the latest definitions included in the Technical Recommendations.
- In March 2018 the revision of SEEA EEA by 2020 has been launched under the auspices of the UN Committee of Experts on Environmental-Economic Accounting (UNCEEAA). More on the revision process can be found [here](#).





## 1.6 Scope and purpose of ecosystem accounting

### Scope and purpose of ecosystem accounting

The SEEA EEA accounting framework provides a common platform for the integration of information on ecosystems and existing accounting information on economic and other human activity dependent upon ecosystems:

- The integration of environmental, ecological and economic information is intended to **mainstream information on ecosystems** within decision making.
- Ecosystem accounting is assessing the environment through the **physical measurement of ecosystems and the flows of services** from these ecosystems into economic and other human activity.
- Ecosystem accounting is based on partitioning the biophysical environment to form a **set of ecosystem assets**, which are then accounted for in a manner analogous to the treatment of produced assets in the System of National Accounts.

#### Ecosystem assets:

- Ecosystem extent
- Ecosystem condition
- Ecosystem services
- Ecosystem capacity

- Economic/other human activity dependent upon ecosystems

- Associated beneficiaries (households, businesses and governments)

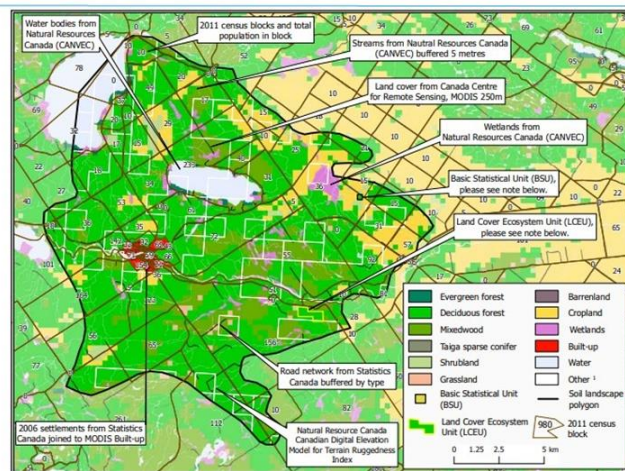
SEEA EEA

## 1.7 Definition of ecosystem assets

### Definition of ecosystem assets

Ecosystem assets are **spatial areas** containing a combination of biotic and abiotic components and other characteristics that function together and provide services:

- Ecosystems are considered assets because they support not only economic production, but also our **well-being, health and security**.
- Ecosystem assets include **forests, wetlands, agricultural areas, rivers and coral reefs**.
- For example, a **forest** is an ecosystem asset that:
  - can be located on a map
  - contains biota like trees, shrubs, grasses, soil organism, birds, mammals, insects functioning together with soil, water, rocks, sunlight and wind
  - enhances air quality
  - contributes to aspects of well-being



Source: Measuring Ecosystem Goods and Services geodatabase, Statistics Canada, 2013: <http://www.statcan.gc.ca/pub/16-201-x/16-201-x2013000-eng.pdf>



## 1.8 The Ecosystem Services Cascade

### Definition of ecosystem services

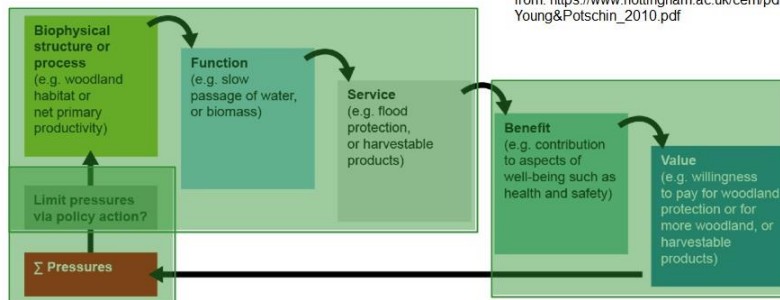
**Ecosystem services** are defined in SEEA EEA as the contribution of ecosystems to benefits for people.

People depend on ecosystems for **food, clean water, flood protection** and much more. Ecosystem accounting focuses on **estimating these services and the value we place on them**.

For example, we might enjoy a forest for its recreational qualities. However, forests are also important for flood protection, water purification, wild food, pollution regulation, carbon sequestration, wind regulation, etc. **The Ecosystem Services Cascade illustrates these interrelations.**

**Explore its steps to find out more!**

Source: Adapted from Haines-Young and Potschin, 2010. Available from: [https://www.nottingham.ac.uk/cem/pdf/Haines-Young&Potschin\\_2010.pdf](https://www.nottingham.ac.uk/cem/pdf/Haines-Young&Potschin_2010.pdf)



### Explanation 1 (Slide Layer)

### Definition of ecosystem services

**Ecosystem services** are defined in SEEA EEA as the contribution of ecosystems to benefits for people.

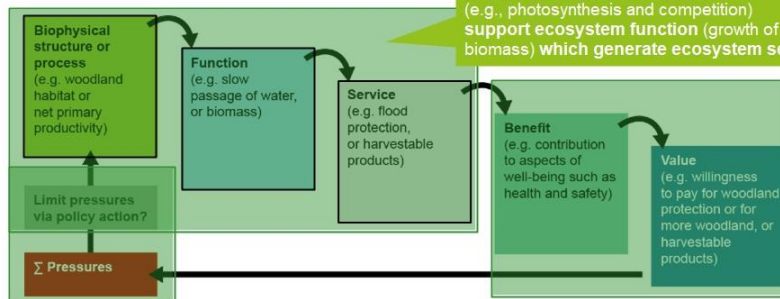
People depend on ecosystems for **food, clean water, flood protection** and much more. Ecosystem accounting focuses on **estimating these services and the value we place on them**.

For example, we might enjoy a forest for its recreational qualities. However, forests are also important for flood protection, water purification, wild food, pollution regulation, carbon sequestration, wind regulation, etc. **The Ecosystem Services Cascade illustrates these interrelations.**


**Explore its steps to find out more!**

**Biophysical structures (e.g., forests and wetlands), composition and processes (e.g., photosynthesis and competition) support ecosystem function (growth of biomass) which generate ecosystem services.**

10. Available



## Explanation 2 (Slide Layer)

MODULE 1: BASIC CONCEPTS Page 8 / 28  SEEA

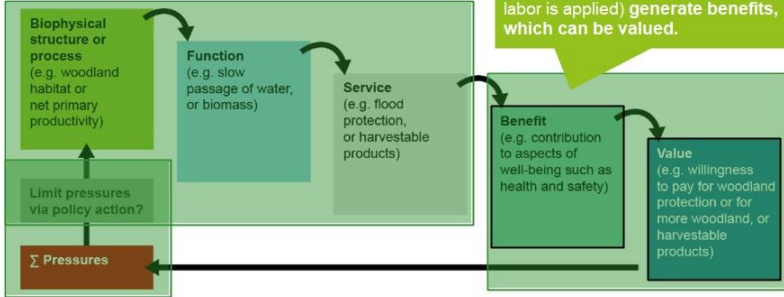
### Definition of ecosystem services

Ecosystem services are defined in SEEA EEA as the contribution of ecosystems to benefits for people. People depend on ecosystems for **food, clean water, flood protection** and much more. Ecosystem accounting focuses on **estimating these services and the value we place on them**.

For example, we might enjoy a forest for its recreational qualities. However, forests are also important for flood protection, water purification, wild food, pollution regulation, carbon sequestration, wind regulation, etc. **The Ecosystem Services Cascade illustrates these interrelations.**

Explore its steps to find out more!


Services, when used (capital as well as labor is applied) generate benefits, which can be valued. 0. Available



```
graph TD; A["Biophysical structure or process  
(e.g. woodland habitat or net primary productivity)"] --> B["Function  
(e.g. slow passage of water, or biomass)"]; B --> C["Service  
(e.g. flood protection, or harvestable products)"]; C --> D["Benefit  
(e.g. contribution to aspects of well-being such as health and safety)"]; D --> E["Value  
(e.g. willingness to pay for woodland protection or for more woodland, or harvestable products)"]; E --> F["Σ Pressures"]; F --> G["Limit pressures via policy action?"]; G --> A;
```

The diagram illustrates the Ecosystem Services Cascade. It shows a flow from Biophysical structure or process (e.g. woodland habitat or net primary productivity) to Function (e.g. slow passage of water, or biomass), then to Service (e.g. flood protection, or harvestable products), then to Benefit (e.g. contribution to aspects of well-being such as health and safety), and finally to Value (e.g. willingness to pay for woodland protection or for more woodland, or harvestable products). A feedback loop exists from Value to Σ Pressures, which then leads to Limit pressures via policy action?, which in turn feeds back into the Biophysical structure or process.

## Explanation 3 (Slide Layer)

MODULE 1: BASIC CONCEPTS Page 8 / 28  SEEA

### Definition of ecosystem services

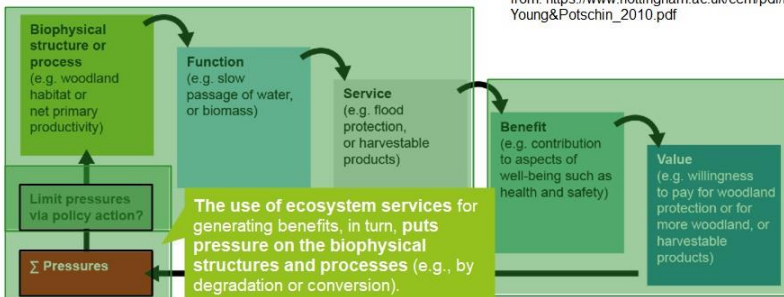
Ecosystem services are defined in SEEA EEA as the contribution of ecosystems to benefits for people. People depend on ecosystems for **food, clean water, flood protection** and much more. Ecosystem accounting focuses on **estimating these services and the value we place on them**.

For example, we might enjoy a forest for its recreational qualities. However, forests are also important for flood protection, water purification, wild food, pollution regulation, carbon sequestration, wind regulation, etc. **The Ecosystem Services Cascade illustrates these interrelations.**

Explore its steps to find out more!

The use of ecosystem services for generating benefits, in turn, puts pressure on the biophysical structures and processes (e.g., by degradation or conversion).

Source: Adapted from Haines-Young and Potschin, 2010. Available from: [https://www.nottingham.ac.uk/cem/pdf/Haines-Young&Potschin\\_2010.pdf](https://www.nottingham.ac.uk/cem/pdf/Haines-Young&Potschin_2010.pdf)



```
graph TD; A["Biophysical structure or process  
(e.g. woodland habitat or net primary productivity)"] --> B["Function  
(e.g. slow passage of water, or biomass)"]; B --> C["Service  
(e.g. flood protection, or harvestable products)"]; C --> D["Benefit  
(e.g. contribution to aspects of well-being such as health and safety)"]; D --> E["Value  
(e.g. willingness to pay for woodland protection or for more woodland, or harvestable products)"]; E --> F["Σ Pressures"]; F --> G["Limit pressures via policy action?"]; G --> A;
```

The diagram illustrates the Ecosystem Services Cascade. It shows a flow from Biophysical structure or process (e.g. woodland habitat or net primary productivity) to Function (e.g. slow passage of water, or biomass), then to Service (e.g. flood protection, or harvestable products), then to Benefit (e.g. contribution to aspects of well-being such as health and safety), and finally to Value (e.g. willingness to pay for woodland protection or for more woodland, or harvestable products). A feedback loop exists from Value to Σ Pressures, which then leads to Limit pressures via policy action?, which in turn feeds back into the Biophysical structure or process.

## 1.9 Untitled Slide

MODULE 1: BASIC CONCEPTS Page 9 / 28 SEEA

### Examples of ecosystem services

- Following the Millennium Ecosystem Assessment it is common to distinguish between provisioning services, regulating services, and cultural services. Supporting services are considered in the SEEA EEA to be part of the functions or processes taking place within ecosystems.
- The focus of ecosystem accounting is on final ecosystem services, that have a direct link between ecosystems and economic units. Intermediate services are services that reflect the dependencies between ecosystem assets.
- The use of a classification of ecosystem services such as **CICES**, **FEGS-CS** or **NESCS** is an important aspect in compiling estimates of ecosystem services flows.



The diagram illustrates the classification of ecosystem services into four main categories: Provisioning Services, Regulating Services, Cultural Services, and Abiotic Resources. Each category is represented by a set of icons and labels. Provisioning Services include Nutrition, Drinking water, Biomass-based energy sources, and Water for non-drinking purposes. Regulating Services include Flood protection, Soil fertility, Mediation by soil, water, air, Pest control, Lifecycle maintenance, Erosion, Carbon sequestration, Pollination, and Water flow maintenance. Cultural Services include Wood, fibers, genetic materials, Physical and experiential interactions, Natural heritage, and Symbolic value. Abiotic Resources include Science and education, Renewable energy sources, Non-renewable energy sources, and Mineral sources. The diagram also shows a central landscape with various ecosystem assets and their interactions.

Source: PBL, RIVM, WUR, CICES 2014

## CICES (Slide Layer)

MODULE 1: BASIC CONCEPTS Page 9 / 28 SEEA

### Examples of ecosystem services

- Following the Millennium Ecosystem Assessment it is common to distinguish between provisioning services, regulating services, and cultural services. Supporting services are considered in the SEEA EEA to be part of the functions or processes taking place within ecosystems.
- The focus of ecosystem accounting is on final ecosystem services, that have a direct link between ecosystems and economic units. Intermediate services are services that reflect the dependencies between ecosystem assets.

**CICES (Common International Classification of Ecosystem Services)**

**CICES**, **FEGS-CS** or **NESCS** is an important aspect in compiling estimates of ecosystem services flows.



The diagram illustrates the classification of ecosystem services into four main categories: Provisioning Services, Regulating Services, Cultural Services, and Abiotic Resources. Each category is represented by a set of icons and labels. Provisioning Services include Nutrition, Drinking water, Biomass-based energy sources, and Water for non-drinking purposes. Regulating Services include Flood protection, Soil fertility, Mediation by soil, water, air, Pest control, Lifecycle maintenance, Erosion, Carbon sequestration, Pollination, and Water flow maintenance. Cultural Services include Wood, fibers, genetic materials, Physical and experiential interactions, Natural heritage, and Symbolic value. Abiotic Resources include Science and education, Renewable energy sources, Non-renewable energy sources, and Mineral sources. The diagram also shows a central landscape with various ecosystem assets and their interactions.

Source: PBL, RIVM, WUR, CICES 2014



## FEGS (Slide Layer)

MODULE 1: BASIC CONCEPTS

Page 9 / 28

SEEA

### Examples of ecosystem services

- Following the Millennium Ecosystem Assessment it is common to distinguish between provisioning services, regulating services, and cultural services. Supporting services are considered in the SEEA EEA to be part of the functions or processes taking place within ecosystems.
- The focus of ecosystem accounting is on final ecosystem services, that have a direct link between ecosystems and economic units. Intermediate services are services that reflect the dependencies between ecosystem assets.
- The use of a classification of ecosystem services such as **CICES**, **FEGS-CS** or **NESCS** is an important aspect in compiling **FEGS-CS (Final Ecosystem Goods and Services Classification System)**  
**NESCS (National Ecosystem Services Classification System)**

The infographic illustrates a landscape with various ecosystem services. **PROVISIONING SERVICES** include Nutrition, Drinking water, Biomass-based energy sources, Water for non-drinking purposes, and Wood, fibers, genetic materials. **REGULATING SERVICES** include Flood protection, Soil fertility, Mediation by soil, water, air, Erosion, Carbon sequestration, Pollination, Water flow maintenance, and Lifecycle maintenance. **CULTURAL SERVICES** include Physical and experiential interactions, Natural heritage, Symbolic value, Science and education, and Maintenance of urban climate. **ABIOTIC RESOURCES** include Renewable energy sources, Non-renewable energy sources, and Mineral sources.

Source: PBL, RIVM, WUR, CICES 2014

## 1.10 Stocks and flows in ecosystem accounting

MODULE 1: BASIC CONCEPTS

Page 10 / 28

SEEA

### Stocks and flows in ecosystem accounting

Each ecosystem asset in the SEEA EEA is accounted for in a manner analogous to the treatment of produced assets such as buildings and machines in the System of National Accounts (SNA). But there are important differences in relation to flows in ecosystem accounts: A common incorrect treatment is to consider improvements in the condition of ecosystem assets as flows that can be combined with flows of ecosystem services. Click on the fields below and explore how concepts of the SNA are adapted within ecosystem accounting!

| SNA | SEEA EEA |
|-----|----------|
|     |          |
|     |          |
|     |          |



## 1.11 Characteristics of the SEEA EEA framework

MODULE 1: BASIC CONCEPTS

Page 11 / 28

SEEA

### Characteristics of the SEEA EEA framework

The accounting framework described in SEEA EEA extends, supports and complements other ecosystem and biodiversity measurement initiatives in four important ways.

**Find out more by hovering over the headlines!**

Assets are accounted for in terms of both ecosystem condition and ecosystem services

Biophysical and monetary accounting

Integration with the SNA

Sub-national and local level

## 1.12 Usage and applications of ecosystem accounting

MODULE 1: BASIC CONCEPTS

Page 12 / 28

SEEA

### Usage and applications of ecosystem accounting

Ecosystem accounts provide important pieces of information in support of policy and decision making relating to environment and natural resources management, recognizing that the management of these resources is of relevance in economic, planning, development and social policy contexts.

**Hover over the fields to see more!**

Detailed, spatial information on ecosystem services supply

Monitoring of the status of ecosystem assets

Highlighting ecosystem assets, types and services of particular concern for policy makers

Monitoring the status and indicating specific areas or aspects of biodiversity under particular threat

Monitoring the effectiveness of various policies

Use in economic and financial decision making

## 1.13 Implementation of ecosystem accounting

### Implementation of ecosystem accounting

By its nature, **ecosystem accounting is an inter-disciplinary undertaking** with each discipline, including statistics, economics, national accounts, ecology, hydrology, biodiversity and geography, bringing its own perspective and language:

- In order to obtain the benefits from an integrated approach, institutional coordination and cooperation is required to support the compilation and use of accounting based solutions.
- Broader development and implementation of ecosystem accounting will require **establishing networks and arrangements involving policy and decision makers**, local communities and other stakeholders.
- It will likely be feasible to use **results and findings from past and ongoing projects** on environmental and ecosystem measurement to inform current work on ecosystem accounting.
- An important aspect of implementation is the **allocation of resources** to coordination, data sharing and communication.
- The role **national statistical offices (NSO)** might play will depend on the scope of activities they have traditionally been involved in. Non-NSO agencies that lead work on geographic and spatial data play an important role.

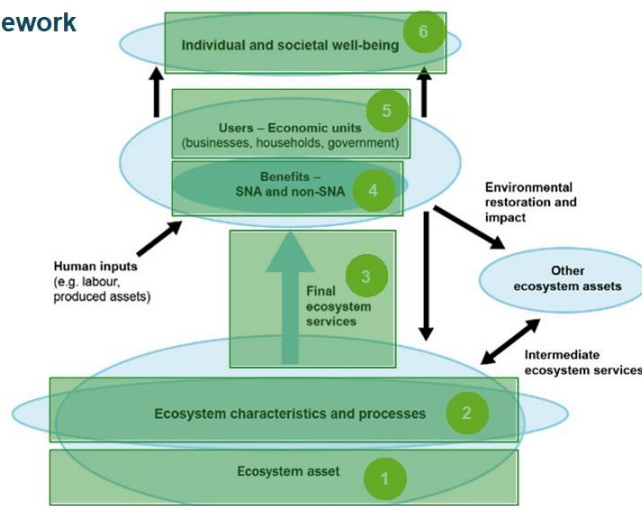


## 1.14 The Ecosystem Services Cascade

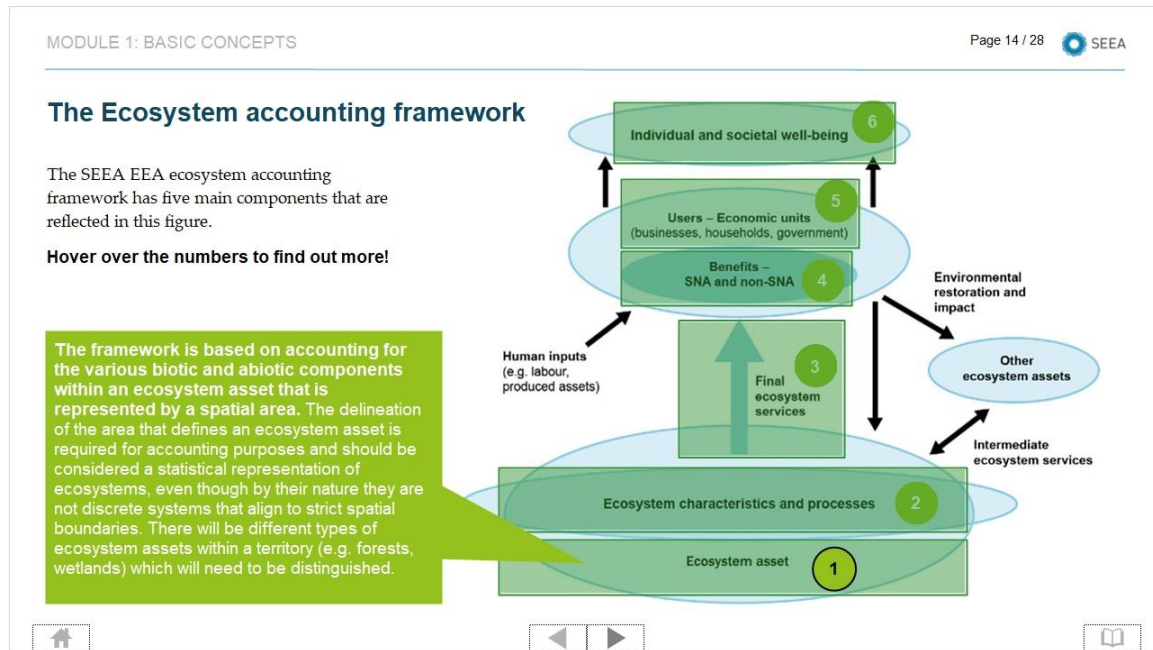
### The Ecosystem accounting framework

The SEEA EEA ecosystem accounting framework has five main components that are reflected in this figure.

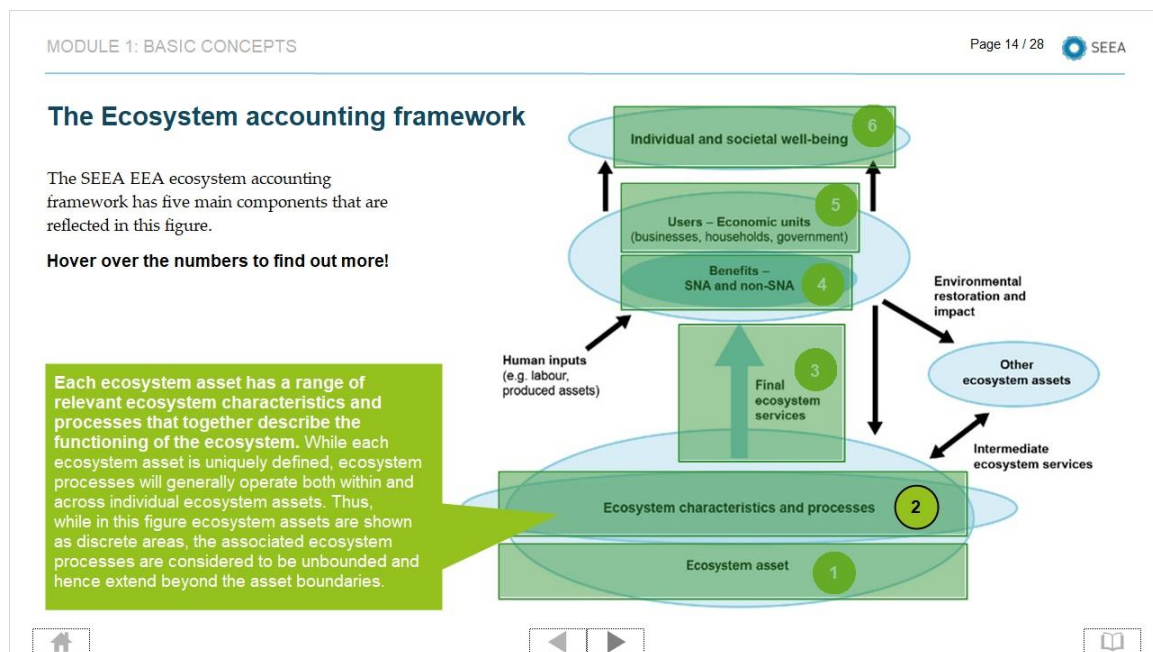
Hover over the numbers to find out more!



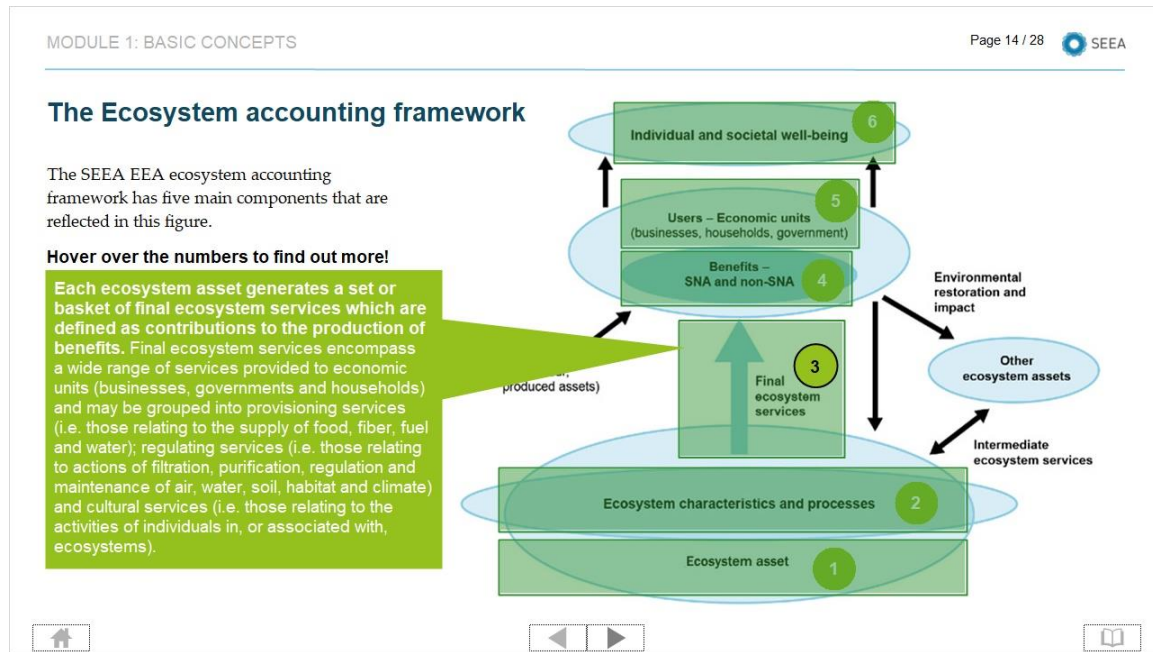
## Explanation 1 (Slide Layer)



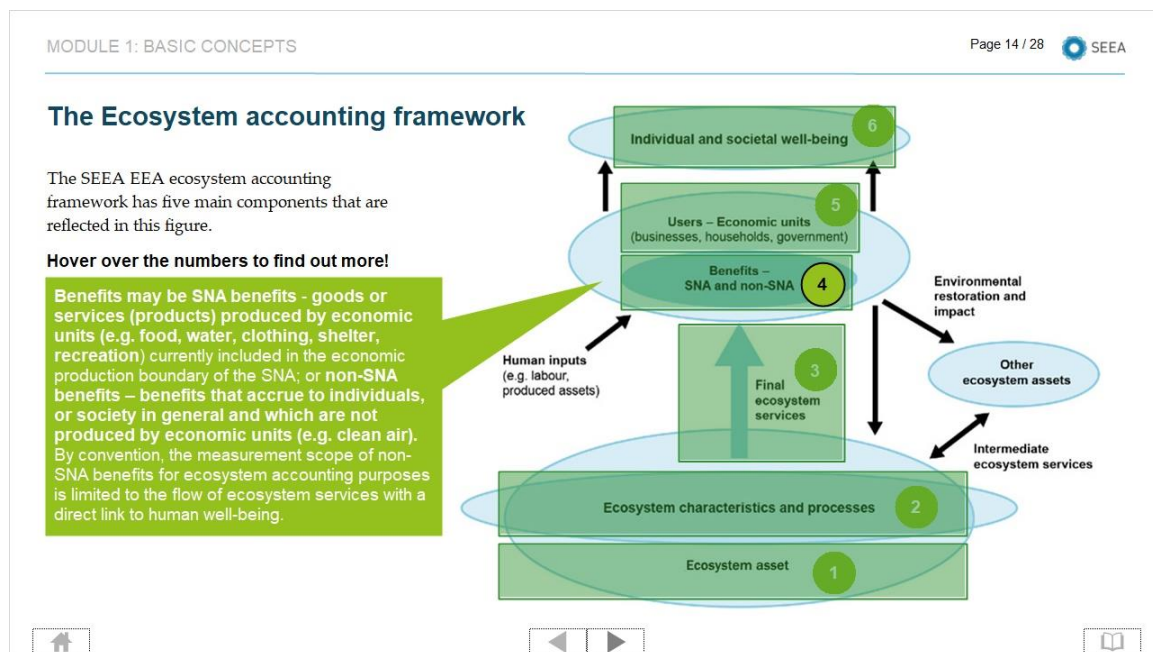
## Explanation 2 (Slide Layer)



## Explanation 3 (Slide Layer)

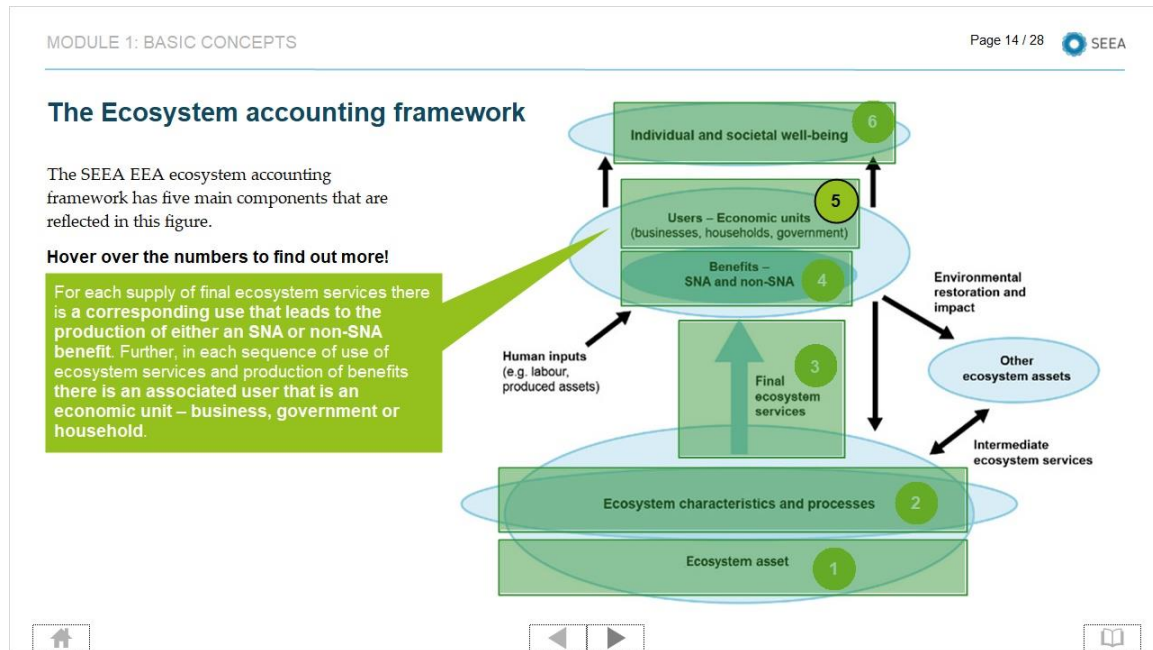


## Explanation 4 (Slide Layer)

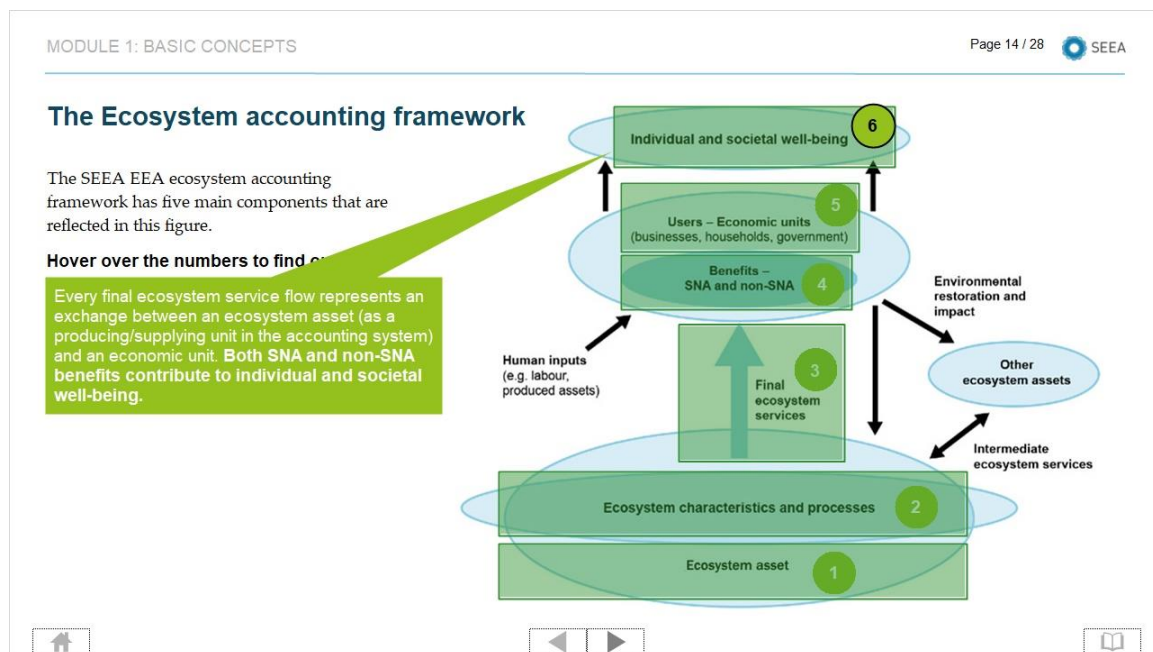




## Explanation 5 (Slide Layer)



## Explanation 6 (Slide Layer)



## 1.15 Connections between ecosystem accounts and related concepts

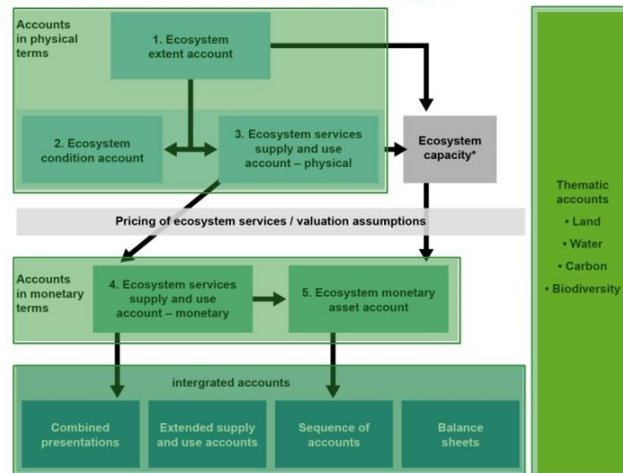
### Connections between ecosystem accounts and related concepts

There are five core ecosystem accounts in the SEEA EEA – three of them compiled in physical and two in monetary terms:

An initial set of accounts typically includes only the physical accounts, eventually extending to a larger set of monetary services and condition indicators.

Initial valuation is normally conducted later and only for the most important services or assets.

Explore the figure to find out more!



### Explanation 1 (Slide Layer)

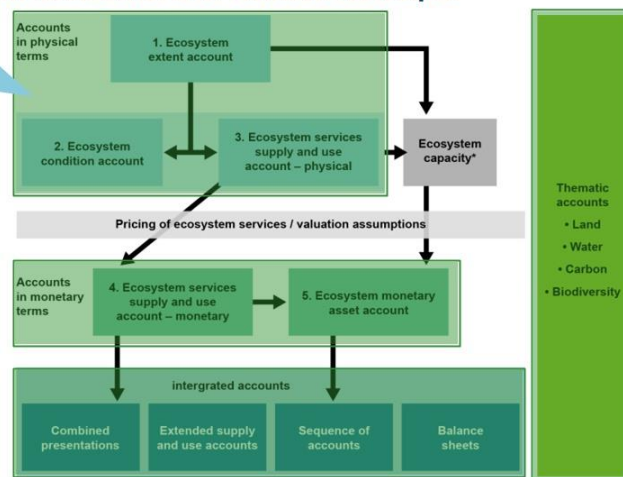
### Connections between ecosystem accounts and related concepts

The ecosystem extent account provides the starting point for compilation. The ecosystem condition account & ecosystem services supply and use account are concurrent exercises. The information from these accounts feeds the measurement of ecosystem capacity, which is not a stand alone ecosystem account.

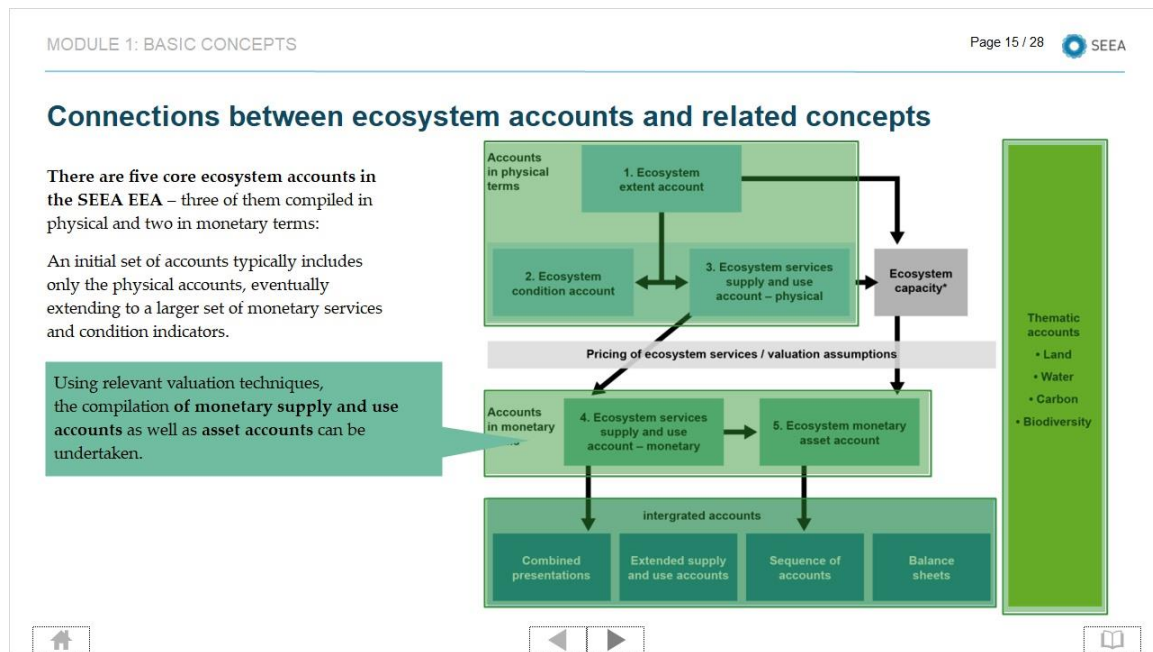
and condition indicators.

Initial valuation is normally conducted later and only for the most important services or assets.

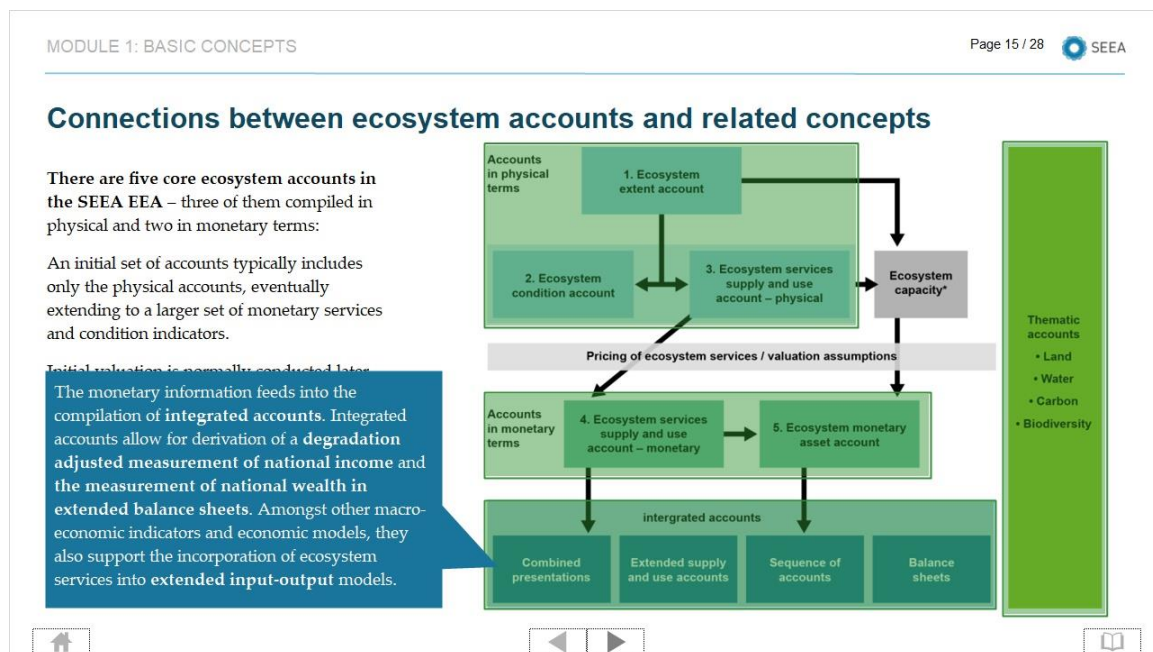
Explore the figure to find out more!



## Explanation 2 (Slide Layer)



## Explanation 3 (Slide Layer)



## Explanation 4 (Slide Layer)

MODULE 1: BASIC CONCEPTS Page 15 / 28 SEEA

### Connections between ecosystem accounts and related concepts

There are five core ecosystem accounts in the SEEA EEA – three of them compiled in physical and two in monetary terms:

An initial set of accounts typically includes only the physical accounts, eventually

The thematic accounts provide information to support compilation of all ecosystem accounts. Thematic accounts can be of direct relevance in supporting discussion for specific policy themes including land planning and management of water resources, carbon stocks and greenhouse gas (GHG) emissions and biodiversity.

The diagram illustrates the SEEA EEA framework. It shows five core accounts: 1. Ecosystem extent account, 2. Ecosystem condition account, 3. Ecosystem services supply and use account – physical, 4. Ecosystem services supply and use account – monetary, and 5. Ecosystem monetary asset account. Accounts 1-3 are in physical terms, while 4-5 are in monetary terms. Arrows indicate the flow of information and dependencies. A box labeled 'Pricing of ecosystem services / valuation assumptions' connects the physical and monetary accounts. To the right, a vertical bar lists 'Thematic accounts: Land, Water, Carbon, Biodiversity'. At the bottom, a box labeled 'Integrated accounts' contains 'Combined presentations', 'Extended supply and use accounts', 'Sequence of accounts', and 'Balance sheets'.

## 1.16 Starting point for accounting

(Multiple Response, 10 points, 1 attempt permitted)

MODULE 1: BASIC CONCEPTS Page 16 / 28 SEEA

### Starting point for accounting

Ecosystem extent accounts organize information based on the extent or area of different ecosystem types within a country. Can you imagine why they are the starting point of ecosystem accounting?

**Check all reasons you consider important!**

- ☒ In defining the ecosystems of interest a balance between scale of analysis, available data and policy questions needs to be found, that can be informed. It is very appropriate to start this discussion by examining the definition of ecosystem assets and the delineation of their extent.
- ☒ The organization of information will provide the basis for subsequent measurement of ecosystem condition and many ecosystem services.
- ☒ The structure of the ecosystem extent account allow meaningful comparison between the opening and closing of an accounting period.
- ☒ When compiled at appropriate levels of detail, ecosystem extent accounts provide a common basis for discussion among stakeholders.

The diagram is identical to the one in slide 15, showing the flow from physical accounts to monetary accounts through pricing assumptions, leading to integrated accounts. Thematic accounts (Land, Water, Carbon, Biodiversity) are shown on the right.

OK



| Correct | Choice  |
|---------|---|
| X       | In defining the ecosystems of interest a balance between scale of analysis, available data and policy questions needs to be found, that can be informed. It is very appropriate to start this discussion by examining the definition of ecosystem assets and the delineation of their extent. |
| X       | The organization of information will provide the basis for subsequent measurement of ecosystem condition and many ecosystem services.   |
| X       | The structure of the ecosystem extent account allow meaningful comparison between the opening and closing of an accounting period.  |
| X       | When compiled at appropriate levels of detail, ecosystem extent accounts provide a common basis for discussion among stakeholders.  |

**Feedback when correct:**

The task of defining the ecosystems of interest for accounting purposes requires many basic discussions and decisions. The structure of the ecosystem extent account gives a clear indication of the nature of accounting for assets in a SEEA context.

**Feedback when incorrect:**

The task of defining the ecosystems of interest for accounting purposes requires many basic discussions and decisions. The structure of the ecosystem extent account gives a clear indication of the nature of accounting for assets in a SEEA context.

## Correct (Slide Layer)

MODULE 1: BASIC CONCEPTS

Page 16 / 28

SEEA

### Starting point for accounting

Ecosystem extent accounts organize information based on the extent or area of different ecosystem types within a country. Can you imagine why they are the starting point of ecosystem accounting?

**Check all reasons you consider important!**

- ☒ In defining the ecosystems of interest a balance between scale of analysis, available data and policy questions needs to be found, that can be informed. It is very appropriate to start this discussion by examining the definition of ecosystem assets and the delineation of their extent.
- ☒ The organization of information will provide the basis for subsequent measurement of ecosystem condition and many ecosystem services.
- ☒ The structure of the ecosystem extent account allow meaningful comparison between the opening and closing of an accounting period.
- ☒ When compiled at appropriate levels of detail, ecosystem extent accounts provide a common basis for discussion among stakeholders.

Accounts in physical terms

1. Ecosystem extent account

**Very good!**

The task of defining the ecosystems of interest for accounting purposes requires many basic discussions and decisions. **The structure of the ecosystem extent account gives a clear indication of the nature of accounting for assets in a SEEA context.**

Continue

## Incorrect (Slide Layer)

MODULE 1: BASIC CONCEPTS

Page 16 / 28

SEEA

### Starting point for accounting

Ecosystem extent accounts organize information based on the extent or area of different ecosystem types within a country. Can you imagine why they are the starting point of ecosystem accounting?

**Check all reasons you consider important!**

- ☒ In defining the ecosystems of interest a balance between scale of analysis, available data and policy questions needs to be found, that can be informed. It is very appropriate to start this discussion by examining the definition of ecosystem assets and the delineation of their extent.
- ☒ The organization of information will provide the basis for subsequent measurement of ecosystem condition and many ecosystem services.
- ☒ The structure of the ecosystem extent account allow meaningful comparison between the opening and closing of an accounting period.
- ☒ When compiled at appropriate levels of detail, ecosystem extent accounts provide a common basis for discussion among stakeholders.

Accounts in physical terms

1. Ecosystem extent account

**Not quite right. Take a look at the solution!**

The task of defining the ecosystems of interest for accounting purposes requires many basic discussions and decisions. **The structure of the ecosystem extent account gives a clear indication of the nature of accounting for assets in a SEEA context.**

Continue

## 1.17 Steps in compiling ecosystem accounts

### Steps in compiling ecosystem accounts

In the initial phase of accounting for ecosystems, it will be necessary to understand a limited number of specific purposes for which accounts might be compiled:

- The type of policy question will help determine the scale of the accounts, either national or sub-national (e.g. water catchment, province, habitat type, etc.), and the type of data needed.
- The development of an initial set of ecosystem accounts is likely to spark awareness of additional potential applications.
- Determining the appropriate coverage and spatial detail must be a matter of discussion among the institutions involved in compiling the accounts.
- It will also be necessary to determine the relevant reference period/s. Multiple data sources will need to be brought together and hence methods of adjusting different source data to a common reference period/s will need to be adopted.

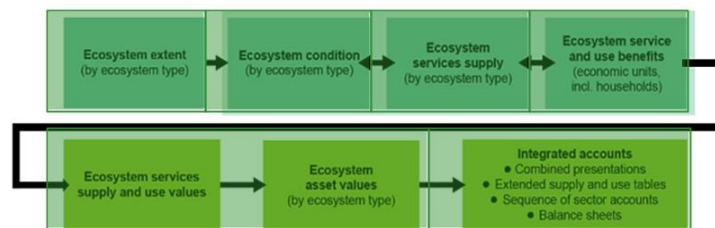


## 1.18 Compilation steps for developing the full set of accounts


### Broad steps in ecosystem accounting

The first set of steps in accounting for ecosystems involves accounting in **physical terms** and the second set of steps is in **monetary terms**. While it is useful to see this sequencing, the reality of accounting is that there will be multiple iterations through the accounts and further, that the precise starting point may vary.

Explore each step to get details!



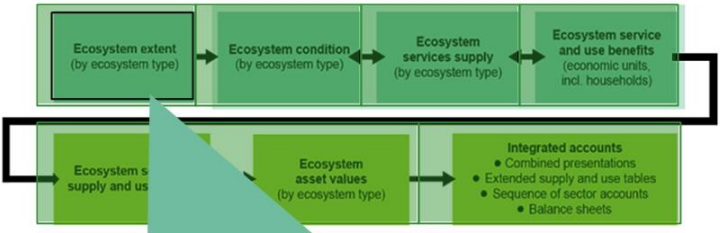
## Explanation 1 (Slide Layer)

MODULE 1: BASIC CONCEPTS Page 18 / 28  SEEA

### Broad steps in ecosystem accounting




The first set of steps in accounting for ecosystems involves accounting in **physical terms** and the second set of steps is in **monetary terms**. While it is useful to see this sequencing, the reality of accounting is that there will be multiple iterations through the accounts and further, that the precise starting point may vary.

**Explore each step to get details!**




The first important step is to delineate the area for which the accounts are compiled: the Ecosystem Accounting Area (EAA). The EAA may cover the entirety of a country's land area (including inland waters) and, as appropriate, relevant coastal and marine areas – perhaps extending to a country's exclusive economic zone (EEZ).

Information on the area of an EAA can be presented in an **ecosystem extent account**. A key aim with this account is to measure the change over time in the composition of ecosystem types within a country.

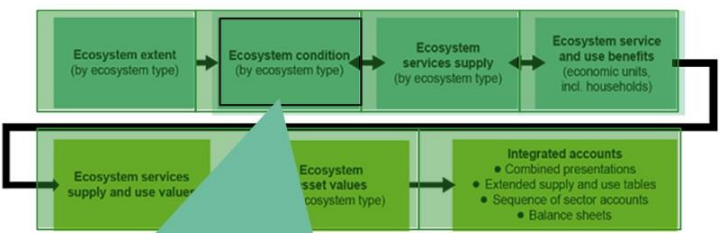
## Explanation 2 (Slide Layer)

MODULE 1: BASIC CONCEPTS Page 18 / 28  SEEA




### Broad steps in ecosystem accounting

The first set of steps in accounting for ecosystems involves accounting in **physical terms** and the second set of steps is in **monetary terms**. While it is useful to see this sequencing, the reality of accounting is that there will be multiple iterations through the accounts and further, that the precise starting point may vary.

**Explore each step to get details!**



Using the listing of ecosystem types determined for the ecosystem extent account, the next step is to compile the **ecosystem condition account**. The ecosystem condition account describes the quality of ecosystems (by type) and how this changes over time. The account is compiled in physical terms using a variety of indicators for selected characteristics of ecosystems such as vegetation, soil, water, soil or biodiversity.



## Explanation 3 (Slide Layer)

MODULE 1: BASIC CONCEPTS Page 18 / 28 SEEA

### Broad steps in ecosystem accounting

The first set of steps in accounting for ecosystems involves accounting in **physical terms** and the second set of steps is in **monetary terms**. While it is useful to see this sequencing, the reality of accounting is that there will be multiple iterations through the accounts and further, that the precise starting point may vary.

**Explore each step to get details!**

The next step involves the measurement of ecosystem services in physical terms.

This is accomplished by considering each ecosystem service in turn and determining the associated ecosystem types and appropriate indicators for understanding supply and use. This should be conducted using a classification of ecosystem services. A classification can provide a checklist to ensure appropriate coverage.

Navigation icons: Home, Previous, Next, Search.

## Explanation 4 (Slide Layer)

MODULE 1: BASIC CONCEPTS Page 18 / 28 SEEA

### Broad steps in ecosystem accounting

The first set of steps in accounting for ecosystems involves accounting in **physical terms** and the second set of steps is in **monetary terms**. While it is useful to see this sequencing, the reality of accounting is that there will be multiple iterations through the accounts and further, that the precise starting point may vary.

**Explore each step to get details!**

The measurement of ecosystem services in physical terms is completed by considering each ecosystem service in turn and determining the associated ecosystem types and appropriate indicators for understanding its supply and use. This task should be conducted using a classification of ecosystem services that should encompass an estimation of both the **supply of ecosystem services** and the **use of those services by various beneficiaries**.

To support integration with the national economic accounts, the beneficiaries are grouped in the same way as for the economic accounts – i.e. by industry group and by institutional sector.

Navigation icons: Home, Previous, Next, Search.

## Explanation 5 (Slide Layer)

MODULE 1: BASIC CONCEPTS
Page 18 / 28
SEEA

### Broad steps in ecosystem accounting

The first set of steps in accounting for ecosystems involves accounting in **physical terms** and the second set of steps is in **monetary terms**. While it is useful to see this sequencing, the reality of accounting is that there will be multiple iterations through the accounts and further, that the precise starting point may vary.

**Explore each step to get details!**

Valuation of ecosystem services in monetary terms is a necessary step for certain types of integration with the standard national accounts, such as adjusted GDP and extended measures of net wealth. The valuation supports the compilation of the ecosystem service supply and use account in monetary terms as well as the ecosystem monetary asset account and measures of ecosystem degradation.

The measurement of ecosystem degradation requires an assessment of ecosystem capacity which reflects the connection between ecosystem condition, ecosystem extent and ecosystem services.

## Explanation 6 (Slide Layer)

MODULE 1: BASIC CONCEPTS
Page 18 / 28
SEEA

### Broad steps in ecosystem accounting

The first set of steps in accounting for ecosystems involves accounting in **physical terms** and the second set of steps is in **monetary terms**. While it is useful to see this sequencing, the reality of accounting is that there will be multiple iterations through the accounts and further, that the precise starting point may vary.

**Explore each step to get details!**

The final step involves augmenting the standard national accounts:

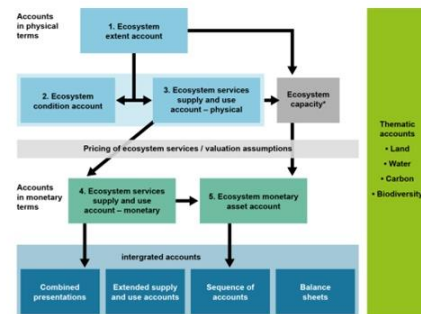
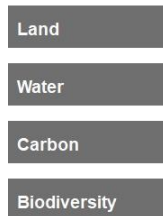
- Combine data on ecosystem condition and services in physical terms alongside economic data (value added, employment, costs of environmental restoration).
- Show integration of ecological and economic supply chains by extension of the services supply and use accounts in monetary terms including products.
- Adjusts standard economic measures (GDP, national income, national saving) for the cost of ecosystem degradation in sector accounts.
- Derive extended measures of national wealth by incorporating the value of ecosystem assets in the national balance sheet.

## 1.19 Thematic accounts

### Thematic accounts

Thematic accounts are standalone accounts on topics of interest in their own right and also of direct relevance in the measurement of ecosystems and in assessing policy responses. In all cases – land, water, carbon and biodiversity – there is a broad range of information and measurement methodologies available. The challenge for ecosystem accounting is the assessment and integration of these data and methods within the SEEA EEA framework.

Find out more by hovering over the headlines!

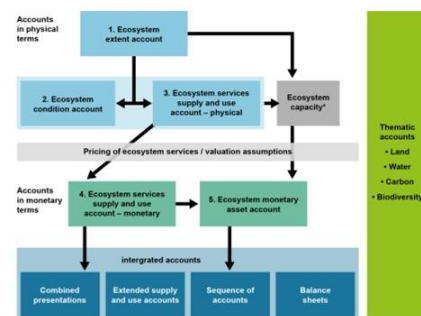


## 1.20 Compilation of thematic accounts

### Why compile thematic accounts?

The incorporation of a thematic focus in the context of ecosystem accounting provides benefits:

- It enables a closer link to be drawn between the compilation of ecosystem accounts and the likely areas of policy response – for example in terms of land management, management of catchments, carbon emissions policy and maintenance of protected areas.
- The data used to understand trends in thematic areas can be used to compile ecosystem accounts, as entries in the ecosystem accounts can be sourced from thematic accounts (e.g. estimates of water provisioning services from water accounts).
- Also the thematic accounts provide a different but comprehensive information to support ecosystem accounting - a number of the thematic accounts can be considered to each measure distinct ecological functions or cycles (e.g. carbon cycle, hydrological cycle).



## 1.21 Key considerations in compiling ecosystem accounts

MODULE 1: BASIC CONCEPTS

Page 21 / 28

SEEA

### Key considerations in compiling ecosystem accounts

Six key considerations emerge in understanding the set of ecosystem accounts as presented in this training.

Hover over the fields to see more!

- The accounts are designed as a system of accounts such that information can be readily compared between them.
- The information should be integrable with the standard national accounts that record economic activity.
- The presented accounting structures should not be considered unchangeable with regard to the level of contained detail.
- The accounts present information for one accounting period, usually one year.
- The structure of accounts will generally represent a level of detail suitable for presentation and analysis of outputs from accounting.
- The implementation of ecosystem accounting is to facilitate comparison of information on ecosystems within and between countries.

Navigation icons: Home, Previous, Next, Search.

## 1.22 Steps in compiling ecosystem accounts

MODULE 1: BASIC CONCEPTS

Page 22 / 28

SEEA

### Valuation in ecosystem accounting

The estimation of monetary values for ecosystem services and ecosystem assets can be undertaken for a variety of purposes:

- The primary purpose of valuation in the SEEA EEA is the **integration of information** on ecosystem condition and ecosystem services with information in the standard national accounts.
  - This provides information to support comparison of ecosystem services with the production and consumption of other goods and services and supports the use of ecosystem information in standard economic modelling and productivity analysis.
  - For this purpose valuation concepts and approaches need to be consistent with the valuation concept used in the national accounts – i.e. exchange values that reflect the price at which ecosystem services and assets would be exchanged between buyer and seller if a market existed.
- For other policy and analytical purposes, different valuation concepts will be appropriate including the estimation of welfare based values and the use of non-monetary valuation techniques.

Navigation icons: Home, Previous, Next, Search.



## 1.23 Characteristics of the SEEA EEA framework

MODULE 1: BASIC CONCEPTS

Page 23 / 28





SEEA

### Valuation techniques

Many transactions with ecosystems are not reflected in observed exchanges of money. Ecosystem services therefore need to be valued using non-market valuation techniques. While many valuation techniques exist, not all are appropriate for obtaining an exchange value of individual ecosystem services.

Find out more by hovering over each valuation technique!

|  |                                       |
|--|---------------------------------------|
| Unit resource rent   | Averting behaviour                    |
| Production function, cost function and profit function methods | Restoration cost                      |
| Payment for Ecosystem Services (PES) schemes                   | Travel cost                           |
| Hedonic pricing  | Stated preference                     |
| Replacement cost   | Marginal values from demand functions |
| Damage costs avoided   |                                       |



## 1.24 Quiz - Understanding valuation concepts

(Multiple Response, 10 points, 1 attempt permitted)

MODULE 1: BASIC CONCEPTS

Page 24 / 28

SEEA





### Understanding valuation concepts

There remains a substantial amount of work to be conducted in order to **advance valuation** in the context of ecosystem accounting. Principal targets involve different challenges such as ensuring that users of the accounts understand the valuation concepts. Do you know what the accounts provide an estimate of?

Check the answer you consider correct!

- ☒ The contribution of ecosystems to economic production and consumption
- ☐ The economic value of ecosystems
- ☐ An estimate of the value of nature

OK



| Correct | Choice  |
|---------|---|
| X       | The contribution of ecosystems to economic production and consumption |
|         | The economic value of ecosystems                                      |
|         | An estimate of the value of nature                                    |

**Feedback when correct:**


The monetary ecosystem accounts estimate  
the monetary value of the contribution of ecosystems to economic production and consumption  
– at least to the extent that a comprehensive set of ecosystem services  
has been used and valuation of these services  
is possible.

**Feedback when incorrect:**

The monetary ecosystem accounts estimate  
the monetary value of the contribution of ecosystems to economic production and consumption  
– at least to the extent that a comprehensive set of ecosystem services  
has been used and valuation of these services  
is possible.

## Correct (Slide Layer)

MODULE 1: BASIC CONCEPTS

Page 24 / 28  SEEA

### Understanding valuation concepts

There remains a substantial amount of work to be conducted in order to **advance valuation** in the context of ecosystem accounting.  
Principal targets involve different challenges such as ensuring that users of the accounts understand the accounts and their use.  
Do you know what the accounts provide an estimate of?

Check the answer you consider correct!

- ☒ The contribution of ecosystems to economic production and consumption
- ☐ The economic value of ecosystems
- ☐ An estimate of the value of nature


**Very good!**

The monetary ecosystem accounts estimate the **monetary value of the contribution of ecosystems to economic production and consumption** – at least to the extent that a comprehensive set of ecosystem services has been used and valuation of these services is possible.

Continue

## Incorrect (Slide Layer)

MODULE 1: BASIC CONCEPTS

Page 24 / 28  SEEA

### Understanding valuation concepts

There remains a substantial amount of work to be conducted in order to **advance valuation** in the context of ecosystem accounting.  
Principal targets involve different challenges such as ensuring that users of the accounts understand the accounts and their use.  
Do you know what the accounts provide an estimate of?

Check the answer you consider correct!

- ☒ The contribution of ecosystems to economic production and consumption
- ☐ The economic value of ecosystems
- ☐ An estimate of the value of nature

**Not quite right. Take a look at the solution!**

The monetary ecosystem accounts estimate the **monetary value of the contribution of ecosystems to economic production and consumption** – at least to the extent that a comprehensive set of ecosystem services has been used and valuation of these services is possible.

Continue

## 1.25 Steps in compiling ecosystem accounts

### Recommendations on valuation

A possible path forward is an improved **differentiation between the relevant valuation techniques** as to when ecosystem services can be relatively easily linked to existing market prices and when the ecosystem services relate to public goods:

- Where ecosystem services can be easily linked to **market prices** (e.g. provisioning services and tourism related services), an important part of the information required for valuation may already be in the national accounts. For these services, valuation serves to specify the contribution of the ecosystem to the related benefits already included in the national accounts in monetary terms.
- In the case of **public services**, including most regulating services that are not captured in the national accounts, spatial models for the physical flows of ecosystem services involved provide the basis for valuation. Replacement costs methods can be applied, based on the least-cost alternative, if it can be reasonably assumed that the service, such as flood protection service, would indeed be replaced if lost.



## 1.26 Summary

### Summary

- **Definition of ecosystem accounting**  
Ecosystem accounting is a coherent framework for integrating measures of ecosystems with measures of economic and other human activity.
- **Scope and purpose of ecosystem accounting**  
The SEEA EEA accounting framework provides a common platform for the integration of information on ecosystem assets and existing accounting information on economic and other human activity dependent upon ecosystems.
- **The ecosystem accounting framework**  
The SEEA EEA ecosystem accounting framework has five main components: (1) Ecosystem assets and ecosystem characteristics and processes, (2) final ecosystem services, (3) SNA and non-SNA benefits, (4) users, (5) individual and societal well-being.
- **Types of ecosystem accounts and approaches to measurement**  
Out of the five core ecosystem accounts in the SEEA EEA, three are compiled in physical terms and two in monetary terms.
- **Steps in compiling ecosystem accounts**  
The first set of steps in accounting for ecosystems involves accounting in physical terms and the second set of steps is in monetary terms.
- **Valuation in ecosystem accounting**  
Valuation starts with the assessment of individual ecosystem services. This will require finding an appropriate monetary value to apply to an imputed exchange of ecosystem services. Many transactions with ecosystems are not reflected in observed exchanges of money. Exchange values must be estimated using non-market valuation techniques





## 1.27 References





MODULE 1: BASIC CONCEPTS

Page 27 / 28

SEEA

### Where can I find more information?

- System of Environmental-Economic Accounting website <http://seea.un.org>
- System of Environmental-Economic Accounting 2012: Experimental Ecosystem Accounting [https://seea.un.org/sites/seea.un.org/files/seea\\_eea\\_final\\_en\\_1.pdf](https://seea.un.org/sites/seea.un.org/files/seea_eea_final_en_1.pdf)
- Technical Recommendations in support of the System of Environmental-Economic Accounting 2012-Experimental Ecosystem Accounting [https://seea.un.org/sites/seea.un.org/files/technical\\_recommendations\\_in\\_support\\_of\\_the\\_seea\\_eea\\_final\\_white\\_cover.pdf](https://seea.un.org/sites/seea.un.org/files/technical_recommendations_in_support_of_the_seea_eea_final_white_cover.pdf)
- Secretariat for the Convention on Biological Diversity (SCBD) <https://www.cbd.int/>
- Quick Start Package (QSP) including GIS exercises (SCBD) <https://www.cbd.int/doc/publications/cbd-ts-77-en.pdf>
- World Bank-WAVES (Wealth Accounting and the Valuation of Ecosystem Services) <https://www.wavespartnership.org>
- World Bank WAVES Policy Forum <https://www.wavespartnership.org/en/forum-natural-capital-accounting-better-policy>



## 1.28 Summary

MODULE 1: BASIC CONCEPTS

Page 28 / 28

SEEA

### Last page...

This is the last screen in Module 1 of the in-depth training on experimental ecosystem accounting.

We hope that this introduction has given you the tools you need to get started with the next module.

See you in Module 2! Thanks for learning!

