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# Introduction to Forest Accounting

National Workshop on Shared Environmental Information Systems (SEIS) and Environmental Statistics for the Sustainable Development Goals (SDGs)

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FORESTS

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## Agenda

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1. Some general words
2. Asset accounts for land (land use and land cover)
3. Forest Accounts
4. Timber Account
5. Exercise
6. Flow accounts and ecosystem accounts

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## Some general words

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## Why forest accounts?

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### Some good reasons

- Comprehensive view (all forests, all timber etc.)
- SEEA uses same classifications as SNA → link to economic statistics
- Consistent units of measure (hectares, tons, etc.) and consistent valuation methods
- Identification of inconsistencies in the data (coverage, errors, concepts)

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## Different sources

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**TABLE 2: Coverage of accounting frameworks with respect to forests**

| Framework | Type of forest information | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Flow of forest products | | Timber resources | | Economic activity connected to forestry | Forest-land | Forest condition | Forest ecosystem services | |
| | Physical | Monetary | Physical | Monetary | | | | Physical | Monetary |
| SNA | | ✓ | | ✓ | ✓ | | | | |
| SEEA CF | | | ✓ | ✓ | ✓ | ✓ | | | |
| SEEA AFF | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| SEEA EEA | | | | | | ✓ | ✓ | ✓ | ✓ |

**SNA = System of National Accounts:** records economic production, investment and wealth
**SEEA-CF = System of Environmental-Economic Accounting:** records assets and flows
**SEEA-AFF = Agriculture, Forestry and Fisheries:** Industry focus on assets and flows
**SEEA-EEA = Experimental Ecosystem Accounting:** records contribution of ecosystems

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## SEEA Central Framework

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### SEEA-CF

1. **5.6.3 Physical asset accounts for land**
   - **Table 5.13** Land Cover: Tree-covered area (hectares)
   - Land Use: Land used for forestry (also other uses) (hectares)
2. **5.6.4 Physical asset account for forest and other wooded land**
   - **Table 5.15** Physical asset account for forest and other wooded land (hectares)
   - **Table 5.16** Monetary asset account for land (currency units)
3. **5.8 Asset accounts for timber resources**
   - **Table 5.19** Physical asset account for timber (cubic meters)
   - **Table 5.20** Monetary asset account for timber (currency units)

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# 2 Asset accounts for land (land use and land cover)

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## Land as an asset

*"Land is a unique environmental asset that delineates the space in which economic activities and environmental processes take place and within which environmental assets and economic assets are located."*

**SEEA Central Framework**

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## Why, what and how?

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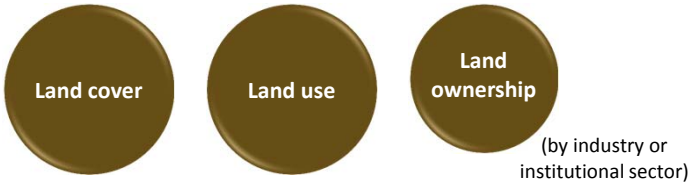
### Physical asset accounts for land

- **Objective**: describe the area of land and changes in the area of land over an accounting period
- Measurement units: **hectares and square meters**
- Different types of physical asset accounts for land:




(by industry or institutional sector)

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## Land use?

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### Land use

- Reflects both:
  - **undertaken activities**
  - the **institutional arrangements** put in place for a given area for the purposes of economic production, or the maintenance and restoration of environmental functions
- Includes **both**:
  - Land in use
  - Land not in use
- Multiple uses? → **principle of primary or dominant use** should be employed

Table 5.11
Land use classification

| | |
|---|---|
| **1** | **Land** |
| 1.1 | Agriculture |
| 1.2 | Forestry |
| 1.3 | Land used for aquaculture |
| 1.4 | Use of built-up and related areas |
| 1.5 | Land used for maintenance and restoration of environmental functions |
| 1.6 | Other uses of land n.e.c. |
| 1.7 | Land not in use |
| **2** | **Inland waters** |
| 2.1 | Inland waters used for aquaculture or holding facilities |
| 2.2 | Inland waters used for maintenance and restoration of environmental functions |
| 2.3 | Other uses of inland waters n.e.c. |
| 2.4 | Inland waters not in use |

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# Land cover?

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## Land cover

- Refers to the observed **physical and biological cover** of the Earth's surface
- Includes **natural vegetation and abiotic** (non-living) **surfaces**
- Includes only land and inland waters, excludes coastal waters
- Uses the Land Cover Classification System (LCCS) developed by FAO

Table 5.12
Land cover classification

| | Category |
|---|---|
| 1 | Artificial surfaces (including urban and associated areas) |
| 2 | Herbaceous crops |
| 3 | Woody crops |
| 4 | Multiple or layered crops |
| 5 | Grassland |
| 6 | Tree-covered areas |
| 7 | Mangroves |
| 8 | Shrub-covered areas |
| 9 | Shrubs and/or herbaceous vegetation, aquatic or regularly flooded |
| 10 | Sparsely natural vegetated areas |
| 11 | Terrestrial barren land |
| 12 | Permanent snow and glaciers |
| 13 | Inland water bodies |
| 14 | Coastal water bodies and intertidal areas |

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# Changes in stock for land cover?

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## Possible changes to stock in the land cover account

| | |
|---|---|
| **Managed expansion** | Increase in the area of a land cover type due to human activity |
| **Natural expansion** | Increase in area resulting from natural processes |
| **Managed regression** | Decrease in the area of a land cover type due to human activity. |
| **Natural regression** | Decrease in area resulting from natural processes |
| **Reappraisals** (upward or downward) | Changes due to the use of updated information that permits a reassessment of the size of the area of different land covers |

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# What does it look like?

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Table 5.13
Physical account for land cover *(hectares)*

| | Artificial surfaces | Crops | Grassland | Tree-covered area | Mangroves | Shrub-covered area | Regularly flooded areas | Sparse natural vegetated areas | Terrestrial barren land | Permanent snow, glaciers and inland water bodies | Coastal water and inter-tidal areas |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Opening stock of resources** | 12 292.5 | 445 431.0 | 106 180.5 | 338 514.0 | 214.5 | 66 475.5 | 73.5 | 1 966.5 | | 12 949.5 | 19 351.5 |
| **Additions to stock** | | | | | | | | | | | |
| Managed expansion | 183.0 | 9 357.0 | | | | | | | | | |
| Natural expansion | | | 64.5 | | | | | | | | 1.5 |
| Upward reappraisals | | | 4.5 | | | | | | | | |
| *Total additions to stock* | 183.0 | 9 357.0 | 69.0 | | | | | | | | 1.5 |
| **Reductions in stock** | | | | | | | | | | | |
| Managed regression | | 147.0 | 4 704.0 | 3 118.5 | 9.0 | 1 560.0 | 1.5 | | | | |
| Natural regression | | | | | 1.5 | 64.5 | | | | | |
| Downward reappraisals | | | | | | 4.5 | | | | | |
| *Total reductions in stock* | | 147.0 | 4 704.0 | 3 118.5 | 10.5 | 1 629.0 | 1.5 | | | | |
| **Closing stock** | 12 475.5 | 454 641.0 | 101 545.5 | 335 395.5 | 204.0 | 64 846.5 | 72.0 | 1 966.5 | | 12 949.5 | 19 353.0 |

**Note:** Crops include herbaceous crops, woody crops, and multiple or layered crops.

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# Tree-covered area?

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**05 Grassland**

This class includes any geographical area dominated by natural herbaceous plants (grasslands, prairies, steppes and savannahs) with a cover of 10 per cent or more, irrespective of different human and/or animal activities, such as grazing or selective fire management. Woody plants (trees and/or shrubs) can be present, assuming their cover is less that 10 per cent.

**06 Tree-covered areas**

This class includes any geographical area dominated by natural tree plants with a cover of 10 per cent or more. Other types of plants (shrubs and/or herbs) can be present, even with a density higher than that of trees. Areas planted with trees for afforestation purposes and forest plantations are included in this class. This class includes areas seasonally or permanently flooded with freshwater. It excludes coastal mangroves (→07).

**07 Mangroves**

This class includes any geographical area dominated by woody vegetation (trees and/or shrubs) with a cover of 10 per cent or more that is permanently or regularly flooded by salt and/or brackish water located in the coastal areas or in the deltas of rivers.

**08 Shrub-covered areas**

This class includes any geographical area dominated by natural shrubs having a cover of 10 per cent or more. Trees can be present in scattered form if their cover is less than 10 per cent. Herbaceous plants can also be present at any density. The class includes shrub-covered areas permanently or regularly flooded by inland fresh water. It excludes shrubs flooded by salt or brackish water in coastal areas (→07).

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# What does it look like?

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Table 5.14
Land cover change matrix (*hectares*)

| Land cover | Opening area | Increases (positive numbers) and decreases (negative numbers) from other land covers: Artificial surfaces | Crops | Grassland | Tree-covered area | Mangroves | Shrub-covered area | Regularly flooded areas | Sparse natural vegetated areas | Terrestrial barren land | Permanent snow, glaciers and inland water bodies | Coastal water and intertidal areas | Net change (increase-decrease) | Closing area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Artificial surfaces | 12 292.5 | | 147.0 | 27.0 | | 9.0 | | | | | | | 183.0 | 12 475.5 |
| Crops | 445 431.0 | -147.0 | | 4 677.0 | 3 118.5 | | 1 560.0 | 1.5 | | | | | 9 210.0 | 454 641.0 |
| Grassland | 106 180.5 | - 27.0 | - 4 677.0 | | | | 69.0 | | | | | | - 4 635.0 | 101 545.5 |
| Tree-covered area | 338 514.0 | | - 3 118.5 | | | | | | | | | | - 3 118.5 | 335 395.5 |
| Mangroves | 214.5 | -9.0 | | | | | | | | | | -1.5 | -10.5 | 204.0 |
| Shrub-covered area | 66 475.5 | | -1 560.0 | -69.0 | | | | | | | | | -1 629.0 | 64 846.5 |
| Regularly flooded areas | 73.5 | | -1.5 | | | | | | | | | | -1.5 | 72.0 |
| Sparse natural vegetated areas | 1 966.5 | | | | | | | | | | | | | 1 966.5 |
| Terrestrial barren land | | | | | | | | | | | | | | |
| Permanent snow, glaciers and inland water bodies | 12 949.5 | | | | | | | | | | | | | 12 949.5 |
| Coastal water and intertidal areas | 19 351.5 | | | | | 1.5 | | | | | | | 1.5 | 19 353.0 |

Note: Including herbaceous crops, woody crops and multiple or layered crops.

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# Forest Account

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## What is a forest account?

### Physical asset account for forest and other wooded land

**Is a specific version of the land account**

Is often compiled in conjunction with the **asset account for timber resources**

Asset Account for **forest and other wooded land**

- **Area of land**
- Changes due to **deforestation and afforestation**
- Does not consider trees outside of forests

Asset account for **timber resources**

- **Volume**
- Changes due to **quantity and quality of timber removed**
- **NOT** limited to timber from forest and other wooded land

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## How are forests classified?

### Basic distinction

- **Naturally regenerated forest**

*"Naturally regenerated forest is forest that is predominantly composed of trees established through natural regeneration. In this context, "predominantly" means that the trees established through natural regeneration are expected to constitute more than 50 per cent of the growing stock at maturity"*

- **Planted forest**

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## How are forests classified?

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**Primary forest**

is **naturally regenerated** forest of native species where there are **no clearly visible indications of human activities** and the ecological processes are not significantly disturbed.

**Other naturally regenerated forest**

is forest with **more than 50 per cent naturally regenerated trees** or clearly visible indications of human activities or naturally regenerated trees of introduced species.

**Planted forests**

are **predominantly** composed of trees established through **planting** or deliberate seeding which constitute more than 50 per cent of the growing stock.

**Other wooded land**

spans more than 0.5 hectares with trees higher than 5 meters and a canopy cover of 5 – 10 per cent, or with a combined cover of shrubs, bushes and trees above 10 per cent.

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## Changes in stock?

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### Possible changes to stock in the forest account

| | |
|---|---|
| **Afforestation** | Increase due to the establishment of new forest on land that was previously not classified as forest land |
| **Natural expansion** | Increase in area resulting from natural seeding, sprouting, suckering or layering |
| **Deforestation** | Decrease due to the complete loss of tree cover and transfer of forest land to other uses |
| **Natural regression** | Decrease in area for natural reasons |

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# What does it look like?

Table 5.15
Physical asset account for forest and other wooded land *(hectares)*

| | Type of forest and other wooded land | | | | |
|---|---|---|---|---|---|
| | Primary forest | Other naturally regenerated forest | Planted forest | Other wooded land | Total |
| **Opening stock of forest and other wooded land** | 20 | 100 | 150 | 130 | 400 |
| **Additions to stock** | | | | | |
| Afforestation | | 2 | 5 | | 7 |
| Natural expansion | | 3 | | | 3 |
| *Total additions to stock* | | 5 | 5 | | 10 |
| **Reductions in stock** | | | | | |
| Deforestation | 2 | 10 | | 5 | 17 |
| Natural regression | | | | 3 | 3 |
| *Total reductions in stock* | 2 | 10 | 0 | 8 | 20 |
| **Closing stock of forest and other wooded land** | 18 | 95 | 155 | 122 | 390 |

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# Timber Account

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## What are timber resources?

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*"Timber resources are defined by the volume of trees, living or dead, and include all trees regardless of diameter, tops of stems, large branches and dead trees lying on the ground that can still be used for timber or fuel."*

**SEEA Central Framework**

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## What is included?

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### Basic principles

- Timber resources may or may not be available for felling (→ wood supply)
  - areas in which logging operations are restricted or prohibited
  - areas that are inaccessible or remote (not economically viable)
  - from a biological perspective, trees don't belong to a commercially useful species

Accounts in physical terms: **Included!**
Accounts in monetary terms: **Excluded!**

- The volume should be measured as the stem volume over bark at a minimum breast height from the ground level or stump height up to the top (principle: commercially usable)
- Cultivated vs. natural timber resources

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## Changes in stock?

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### Possible Additions to stock in the timber account

| | |
|---|---|
| **Natural growth** | Is measured in terms of the **gross annual increment** |
| **Reclassification** | Increase in the **areas of land** that lead to increases in the volume of available timber resources |

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## Changes in stock?

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### Possible Reductions to stock in the timber account

| | |
|---|---|
| **Removals** | Volume of timber resources removed from forest land including removals of trees felled in earlier periods and trees killed or damaged by natural causes |
| **Felling residues** | Timber resources that are rotten, damaged or in excess in terms of size requirements |
| **Natural losses** | Due to mortality from causes other than felling (e.g. insect attack, fire etc. than are **reasonably expected**) |
| **Catastrophic losses** | Losses that are **exceptional and significant** losses due to natural causes (only if there is no possibility that the timber resource can be removed) |
| **Reclassification** | Decrease in the **areas of land** that lead to decreases in the volume of available timber resources |

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# What does it look like?

Table 5.19
Physical asset account for timber resources (*thousands of cubic metres over bark*)

| | Type of timber resource | | |
|---|---|---|---|
| | Cultivated timber resources | Natural timber resources | |
| | | Available for wood supply | Not available for wood supply |
| **Opening stock of timber resources** | 8 400 | 8 000 | 1 600 |
| **Additions to stock** | | | |
| Natural growth | 1 200 | 1 100 | 20 |
| Reclassifications | 50 | 150 | |
| *Total additions to stock* | 1 250 | 1 250 | 20 |
| **Reductions in stock** | | | |
| Removals | 1 300 | 1 000 | |
| Felling residues | 170 | 120 | |
| Natural losses | 30 | 30 | 20 |
| Catastrophic losses | | | |
| Reclassifications | 150 | | 150 |
| *Total reductions in stock* | 1 650 | 1 150 | 170 |
| **Closing stock of timber resources** | 8 000 | 8 100 | 1 450 |
| **Supplementary information** | | | |
| *Fellings* | 1 250 | 1 050 | |

- ✓ Distinction cultivated vs. natural
- ✓ Distinction available vs. not available

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# Exercise

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# 6 Flow accounts and ecosystem accounts

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## Physical and monetary flows

- **Timber is only one product (= goods and services)**
  - Other marketed goods (fuelwood, NTFP)
  - Non-market ecosystem services
    - Regulating and maintenance: flood control, habitat,
    - Cultural: recreation, scientific, spiritual
- **SNA defines monetary flows of forest products**
  - Attributed to supplying sector (usually Forestry Industry)
- **SEEA-CF defines Material Flow Accounts**
  - Physical and monetary supply and use of marketed products
- **SEEA-EEA**
  - Includes marketed forest products (provisioning services)
  - Also defines Ecosystem Services

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## Example material flows

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Physical and monetary supply and use (marketed)
– based on SEEA-CF Material Flows

| Supply (Million tonnes) | | Industry | | Households | Import | Environment | Total |
|---|---|---|---|---|---|---|---|
| | | Forest | Other | | | | |
| Natural Inputs | Timber | | | | | 100 | 100 |
| | Fuelwood | | | | | | |
| | NTFP (cork, gum, fodder, medicine, peat, food, etc.) | | | | | 150 | 150 |
| Products | Lumber | 90 | | | 10 | | 100 |
| | Furniture | | 90 | | 15 | | 105 |
| | NTFP (cork, gum, fodder, medicine, peat, food, etc.) | | 140 | | 5 | | 145 |
| Residuals | Wood waste, etc. | 10 | 20 | | | | 30 |
| Total | | 100 | 250 | | 30 | 250 | 630 |

| Use (Million tonnes) | | Industry | | Households | Export | Environment | Total |
|---|---|---|---|---|---|---|---|
| | | Forest | Other | | | | |
| Natural Inputs | Timber | 100 | | | | | 100 |
| | Fuelwood | | | | | | |
| | NTFP (cork, gum, fodder, medicine, peat, food, etc.) | | 150 | | | | 150 |
| Products | Lumber | | 100 | | | | 100 |
| | Furniture | | | 60 | 45 | | 105 |
| | NTFP (cork, gum, fodder, medicine, peat, food, etc.) | | | 95 | 50 | | 145 |
| Residuals | Wood waste, etc. | | | | | 30 | 30 |
| Total | | 100 | 250 | 155 | 95 | 30 | 630 |

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## Physical and monetary flows

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- **Monetary flows already in SNA**
  - Value of timber harvested by timber industry
  - Value of lumber sold and imports (to furniture industry)
  - Value of furniture sold and imports to households and exports
- **Physical flow accounts**
  - Include flows from the environment (natural inputs)
  - Include flows to the environment (residuals)
  - Can be estimated from price/volume (e.g., $/ton of lumber)

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# Ecosystem services

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Ecosystem services

- **Can be valued, but not all within SNA; Why?**
  - SNA records market exchanges between economic units
- **SNA Benefits: (e.g., timber, NTFP)**
  - Produced by economic units
  - Potential to be bought and sold on market
  - Value in terms of potential market value
- **Non-SNA Benefits: (e.g., water regulation, air purification, carbon sequestration, spiritual)**
  - Not produced by economic units
  - Not bought and sold on market
  - Still very important to human well-being (health, stable climate, clean air, lower risk from extreme events, exposure to nature…)
- **Important to measure in physical terms first**
  - Can apply valuation methods appropriate to purpose

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# Ecosystem services

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Ecosystem services

- Based on Common International Classification of Ecosystem Services (CICES)
- Not mutually exclusive
- A list of "final" services
- Detailed (48 at 4-digit)
- Does not include "supporting" or "intermediate" services (= ecosystem processes & conditions)
- Physical measures and valuation methods not standardized (yet)

| Section | Division | Group |
|---|---|---|
| 01. Provisioning | 01.01 Nutrition | 01.01.01 Biomass |
| | | 01.01.02 Water |
| | 01.02 Materials | 01.02.01 Biomass |
| | | 01.02.02 Water |
| | 01.03 Energy | 01.03.01 Biomass-based energy sources |
| | | 01.03.02 Mechanical energy |
| 02. Regulation & Maintenance | 02.01 Mediation of waste, toxics and other nuisances | 02.01.01 Mediation by biota |
| | | 02.01.02 Mediation by ecosystems |
| | 02.02 Mediation of flows | 02.02.01 Mass flows |
| | | 02.02.02 Liquid flows |
| | | 02.02.03 Gaseous / air flows |
| | 02.03 Maintenance of physical, chemical, biological conditions | 02.03.01 Lifecycle maintenance, habitat and gene pool protection |
| | | 02.03.02 Pest and disease control |
| | | 02.03.03 Soil formation and composition |
| | | 02.03.04 Water conditions |
| | | 02.03.05 Atmospheric composition and climate regulation |
| 03. Cultural | 03.01 Physical and intellectual interactions with biota, ecosystems, and land-/seascapes [environmental settings] | 03.01.01 Physical and experiential interactions |
| | | 03.01.02 Intellectual and representative interactions |
| | 03.02 Spiritual, symbolic and other interactions with biota, ecosystems, and land-/seascapes [environmental settings] | 03.02.01 Spiritual and/or emblematic |
| | | 03.02.02 Other cultural outputs |

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# Which services are provided by forests?

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Tree covered areas

- **Provisioning**
  - Nutrition
    - Food
    - Drinking water
  - Materials
    - Biomass
    - Water
  - Energy
    - Biomass
- **Regulation & Maintenance**
  - Mediation of wastes, toxics…
  - Mediation of flows (mass, water…)
  - Maintenance of physical, chemical and biological conditions
    - Carbon sequestration
- **Cultural**
  - Physical
  - Intellectual
  - Spiritual

| Ecosystem type | 01.01.01 Biomass | 01.01.02 Water | 01.02.01 Biomass | 01.02.02 Water | 01.03.01 Biomass based energy sources | 01.03.02 Mechanical energy | 02.01.01 Mediation by biota | 02.01.02 Mediation by ecosystems | 02.02.01 Mass flows | 02.02.02 Liquid flows | 02.02.03 Gaseous / air flows | 02.03.01 Lifecycle maintenance, habitat and gene pool protection | 02.03.02 Pest and disease control | 02.03.03 Soil formation and composition | 02.03.04 Water conditions | 02.03.05 Atmospheric composition and climate regulation | 03.01.01 Physical and experiential interactions | 03.01.02 Intellectual and representative interactions | 03.02.01 Spiritual and/or emblematic | 03.02.02 Other cultural outputs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01. Artificial surfaces | | | | | | | | | | | | | | | | | | | | |
| 02. Herbaceous crops | ● | | ● | | ● | | | | | | | | | | | | ● | · | • | |
| 03. Woody crops | ● | | ● | | ● | | | | | | | | | | | | ● | • | • | |
| 04. Multiple or layered crops | ● | | ● | | ● | | | | | | | | | | | | ● | • | • | |
| 05. Grassland | ● | | ● | | | | ● | ● | • | | | ● | | ● | | | ● | • | ● | |
| 06. Tree covered areas | • | ● | ● | · | • | | ● | ● | • | • | · | • | · | ● | • | ● | ● | • | ● | |
| 07. Mangroves | ● | ● | ● | | • | | | ● | ● | • | • | • | | | | | ● | • | | |
| 08. Shrub covered areas | | | • | | | | | ● | | | | | | | | | ● | • | ● | |
| 09. Shrubs and/or herbaceous vegetation, aquatic or regularly flooded | ● | ● | ● | ● | · | | ● | ● | ● | ● | · | · | ● | ● | · | | ● | ● | ● | |
| 10. Sparsely natural vegetated areas | | ● | ● | | · | | | | · | | | | | ● | | | ● | · | ● | |
| 11. Terrestrial barren land | | ● | ● | | | | | | · | | | | | ● | | | ● | • | ● | |
| 12. Permanent snow and glaciers | | | | | | | | | | | | | | | | | | | | |
| 13. Inland water bodies | ● | ● | ● | ● | · | | ● | ● | · | • | · | | | | | | ● | • | ● | |
| 14. Coastal water bodies and inter-tidal areas | ● | | • | | | | | · | • | · | · | · | | | | | ● | • | · | |
| 15. Open ocean | · | | • | | | | | | | | | | | | | | ● | · | • | |
| 16. Atmosphere | | | | | | | | | | | | | | | | | | | | |
| 17. Groundwater | | | | | | | | | | | | | | | | | | | | |
| 18. Soil | | | | | | | | | | | | | | | | | | | | |

Note: The circles show the proportion of cells within a cluster of ecosystem and service types for which there was consensus of four authors:

| | |
|---|---|
| 2/3 - 1 | ● |
| 1/3 - < 2/3 | • |
| 0 - < 1/3 | · |

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# Example

FORESTS

## Example in physical units

| Ecosystem service | | Units | Land cover type: Urban | Pasture | Cropland | Forest | Heath | Peat | Surface Water | Other nature | Provincial total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Provisioning | Hunting | kg meat | - | 9,100 | 14,732 | 8,100 | 678 | 70 | | 1,513 | **34,193** |
| | Drinking water extraction | $10^3$ $m^3$ water | 4,071 | 7,026 | 11,227 | 3,117 | 214 | - | 478 | 862 | **26,995** |
| | Crop production | $10^6$ kg produce | - | - | 1,868 | - | - | - | - | - | **1,868** |
| | Fodder production | $10^6$ kg dry matter | | 533 | 251 | | | | | | **784** |
| Regulation | Air quality regulation | $10^3$ kg $PM_{10}$ | 272 | 404 | 717 | 700 | 45 | 7 | 40 | 69 | **2,254** |
| | Carbon sequestration | $10^6$ kg carbon | 875 | 8,019 | 273 | 50,664 | 393 | 149 | - | 1,056 | **61,429** |
| Cultural | Recreational cycling | $10^3$ trips | 2,690 | 1,863 | 2,611 | 1,565 | 30 | 3 | 139 | 220 | **9,121** |

Note: Units of measure are very different!

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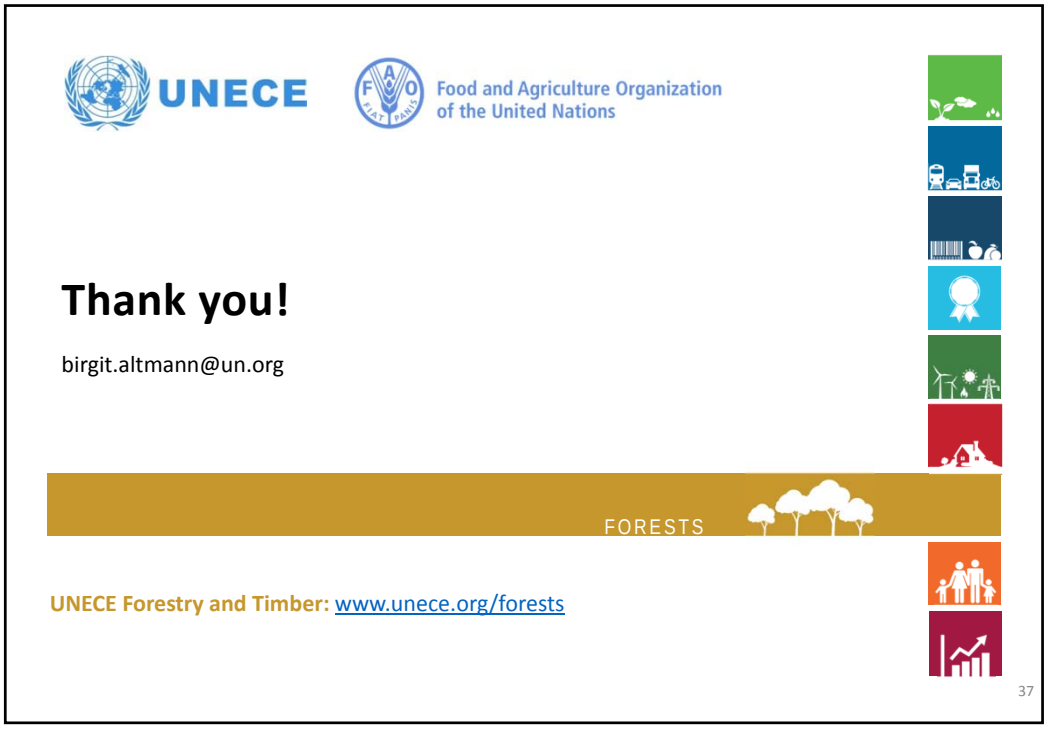
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Thank you!
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