DAY 02: SESSION 04

Asset Accounts: Structure and Principles

Regional Training Workshop on the System of Environmental-Economic Accounting

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Learning Outcomes

On completion of this unit, you will be able to:

• explain the general purpose of asset accounting
• explain the links between balance sheets and asset accounts
• describe the assets that make up asset accounts
• understand the difference between physical and monetary accounts
Unit Outline

• what are assets in the SEEA-CF?
• asset classification
• group activity
• valuation of environmental assets
### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>SEEA</td>
<td>System of Environmental-Economic Accounting</td>
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<tr>
<td>SEEA-CF</td>
<td>SEEA Central Framework</td>
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<tr>
<td>SNA</td>
<td>System of National Accounts</td>
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<tr>
<td>ASNA</td>
<td>Australian System of National Accounts</td>
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<td>CBRs</td>
<td>Cultivated Biological Resources</td>
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<td>COFC</td>
<td>Consumption of Fixed Capital</td>
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<tr>
<td>NPV</td>
<td>Net Present Value</td>
</tr>
<tr>
<td>SUTs</td>
<td>Supply and Use Tables</td>
</tr>
</tbody>
</table>
Asset Account: Structure and Principles

This session is based on Chapter 05 *Classification of environment assets in the Central Framework* in the System of Environmental-Economic Accounting 2012 - Central Framework.
What Are Assets in SNA?

SNA records economic assets:

- an "asset life" of one year or more
- ownership rights enforceable by institutional units
- institutional units are entitled to claim the benefits associated with the use of the asset in question
- values expressed in monetary terms only, including current and constant prices or chain volume measures
- divided between produced and non-produced assets
What Are Assets in SNA?

Environmental resources (or assets) are included in the balance sheets if these criteria are met:

Resources such as the atmosphere or high seas, over which no ownership rights can be exercised, or mineral or fuel deposits that have not been discovered or that are unworkable, are not included as they are not capable of bringing any benefits to their owners, given the technology and relative prices existing at the time (SNA, 2008, para. 1.46).
What Are Assets in SEEA-CF?

SEEA-CF has a similar scope to SNA with a focus on the individual components that make up the environment:

- resources available for use in economic activity
- harvesting, extraction or direct use in economic production, consumption and accumulation

This scope includes land and inland waters that provide space for undertaking economic activity.

What Are Assets in SEEA-CF?

SEEA-CF records environmental assets which are also economic assets under SNA criteria:

- an "asset life" of one year or more
- ownership rights enforceable by institutional units
- institutional units are entitled to claim the benefits associated with the use of the asset in question
- values expressed in physical and monetary terms
- monetary values in current prices only to date
- divided between land, natural assets and CBRs
What Are Assets in SEEA-CF?

1. **Mineral and energy resources**
   1.1 Oil resources
   1.2 Natural gas resources
   1.3 Coal and peat resources
   1.4 Non-metallic mineral resources (excluding coal and peat resources)
   1.5 Metallic mineral resources

2. **Land**

3. **Soil resources**

4. **Timber resources**
   4.1 Cultivated timber resources
   4.2 Natural timber resources

5. **Aquatic resources**
   5.1 Cultivated aquatic resources
   5.2 Natural aquatic resources

6. **Other biological resources** (excluding timber and aquatic resources)

7. **Water resources**
   7.1 Surface water
   7.2 Groundwater
   7.3 Soil water

**SOURCE:** adapted from Table 5.2.1 Classification of environmental assets in the SEEA Central Framework, in UN (2013) System of Environmental-Economic Accounting 2012 - Central Framework, p.125.
GROUP ACTIVITY
Valuation of Environmental Assets

Asset accounts are used to determine the wealth held in environmental assets in physical and monetary terms. In principle, all benefits delivered by environmental assets can be valued in monetary terms:

• physical measures were the usual method pre-SEEA
• countries like Australia produced experimental monetary estimates of some assets in SNA balance sheets
• the focus of SEEA is to monetarise the value of environmental assets and their benefits
Valuation of Environmental Assets

• how much is spent on maintaining and improving environmental assets?
• asset accounts are required to support measures of resource depletion in physical and monetary terms
• compare value of depletion with various measures
• cannot manage what we do not measure
• wealth per person or per capita
• how much income is generated from environmental assets?
Valuation of Environmental Assets

In the Central Framework, consistent with the SNA, the scope of valuation is limited to the benefits that accrue to economic owners of economic assets (including many environmental assets):

SOURCE: Figure 5.1 Relationship between environmental and economic assets, in UN (2014) *System of Environmental-Economic Accounting 2012 - Central Framework*, p.139.
## Valuation of Environmental Assets

### Australia's Total Assets, Current Prices — as at 30 June ($ billion)

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>1992</th>
<th>2002</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building &amp; structures</td>
<td>991.5</td>
<td>1672.4</td>
<td>3473.1</td>
</tr>
<tr>
<td>Machinery &amp; equipment</td>
<td>240.8</td>
<td>346.2</td>
<td>588.0</td>
</tr>
<tr>
<td>Other non-financial produced assets</td>
<td>193.8</td>
<td>347.3</td>
<td>616.4</td>
</tr>
<tr>
<td>Environmental assets</td>
<td>749.4</td>
<td>1875.7</td>
<td>4557.9</td>
</tr>
<tr>
<td>Other non-financial non-produced assets</td>
<td>0.0</td>
<td>8.3</td>
<td>11.5</td>
</tr>
<tr>
<td>Financial assets</td>
<td>127.0</td>
<td>524.5</td>
<td>1241.1</td>
</tr>
<tr>
<td><strong>TOTAL ASSETS</strong></td>
<td>2302.5</td>
<td>4774.4</td>
<td>10488.0</td>
</tr>
</tbody>
</table>

Environmental assets (% of total)  

<table>
<thead>
<tr>
<th></th>
<th>1992</th>
<th>2002</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>32.5%</td>
<td>39.3%</td>
<td>43.5%</td>
</tr>
</tbody>
</table>

**SOURCE:** adapted from Table 10 National Balance Sheet — Volume | Real and Current Prices (electronic), in ABS cat. no. 5204.0 Australian System of National Accounts, 2011-12.
Valuation of Environmental Assets

In physical terms, the scope of environmental assets measured in the Central Framework may be greater than the scope of environmental assets measured in monetary terms following the SNA definition of economic assets.

This is because there is no requirement in physical terms that environmental assets must deliver economic benefits to an economic owner.
Valuation of Environmental Assets

There may be environmental assets that are recorded in the Central Framework in physical terms which have no measured monetary value, and are therefore excluded from environmental assets measured in monetary terms.

Where such assets are recorded in physical terms, the quantities should be recorded separately from quantities of environmental assets that do deliver economic benefits to economic owners.
Valuation of Environmental Assets

Physical asset accounts are usually compiled for specific types of assets:

- different units are used for different assets meaning aggregation is not generally possible
- physical units lack a common unit of measurement
- currency provides a common unit of measurement for monetary values (comparability)
Valuation of Environmental Assets

Asset accounts (like balance sheets) record:

- stock levels (opening and closing)
- additions to (and reductions in) stock

There are special types of asset accounts:

- land accounts
- water accounts
### Table 5.2
General structure of the physical asset account for environmental assets (physical units)

<table>
<thead>
<tr>
<th></th>
<th>Mineral and energy resources</th>
<th>Land (including forest land)</th>
<th>Soil resources</th>
<th>Timber resources</th>
<th>Aquatic resources</th>
<th>Water resources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cultivated</td>
<td>Natural</td>
<td></td>
</tr>
<tr>
<td>Opening stock of resources</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Additions to stock of resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth in stock</td>
<td>na</td>
<td>Yes*</td>
<td>Soil formation</td>
<td>Growth</td>
<td>Natural growth</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Soil deposition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discoveries of new stock</td>
<td>Yes</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upward reappraisals</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes*</td>
<td>Yes*</td>
<td>Yes*</td>
<td>Yes</td>
</tr>
<tr>
<td>Reclassifications</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>na</td>
</tr>
<tr>
<td>Total additions to stock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reductions in stock of resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extractions</td>
<td>Extractions</td>
<td>na</td>
<td>Soil extraction</td>
<td>Natural losses</td>
<td>Natural losses</td>
<td></td>
</tr>
<tr>
<td>Normal reductions in stock</td>
<td>na</td>
<td>na</td>
<td>Erosion</td>
<td>Natural losses</td>
<td>Natural losses</td>
<td></td>
</tr>
<tr>
<td>Catastrophic losses</td>
<td>Yes*</td>
<td>Yes*</td>
<td>Yes*</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Downward reappraisals</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes*</td>
<td>Yes*</td>
<td>Yes*</td>
<td>Yes</td>
</tr>
<tr>
<td>Reclassifications</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Total reductions in stock</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Closing stock of resources</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: “na” means not applicable.
* An asterisk indicates that this entry is usually not significant for the resource or is typically not separately identified in the source data. In practice, not all cells that reflect the possibility of an entry here should be shown separately in published accounts for each type of resource.

**SOURCE:** Table 5.2 in UN (2014) *System of Environmental-Economic Accounting 2012 - Central Framework*, p.142.
Valuation of Environmental Assets

There are five types of reductions in the stock of an environmental asset:

• extraction
• normal reductions in stock
• catastrophic losses
• downward reappraisals
• reclassifications
Valuation of Environmental Assets

Entries related to changes in land cover and land use—for example, within an asset account for forest and other wooded land—are generally in the nature of reclassifications.

Thus, for the analysis of changes in land cover and land use, it is often useful to record entries relating to different types of reclassifications.
Valuation of Environmental Assets

The compilation of asset accounts by *institutional sector* may be desirable for particular types of environmental assets where the ownership of resources is of policy or analytical interest, including the attribution of mineral and energy resources between government units and extracting units, and the assessment of the ownership of land.
Valuation of Environmental Assets

Additional entries are required if asset accounts are to be created for institutional sectors:

• acquisitions and disposals of environmental assets
• uncompensated seizures
• possible impact on national-level accounts
  e.g. a unit of one country seizes assets of another
### Table 5.3

**Conceptual form of the monetary asset account (currency units)**

<table>
<thead>
<tr>
<th>Opening stock of resources</th>
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<tbody>
<tr>
<td>Additions to stock of resources</td>
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<tr>
<td></td>
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<tr>
<td>Reductions in stock of resources</td>
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</table>

**SOURCE:** Table 5.3 in UN (2014) *System of Environmental-Economic Accounting 2012 - Central Framework*, p.144.
Valuation of Environmental Assets

For most environmental assets, it will be the case that measurement requires the estimation of the physical flows followed by estimation of the monetary flows.
Valuation of Environmental Assets

The monetary account reflects a valuation of physical flows as recorded in the physical asset account. The measurement scope is broader in physical terms for some environmental assets. For example:

• timber resources not used for wood supply are included in physical terms but excluded in monetary terms
• mineral and energy resources not deemed to be sub-economic are treated in the same way
Valuation of Environmental Assets

The only additional entry recorded in the monetary asset account compared with the physical asset account concerns revaluations:

- revaluations relate to changes in the value of assets due solely to price changes and reflecting nominal holding gains and losses on environmental assets
- the nominal holding gain for environmental assets is calculated as the increase in value accruing to the owner of the asset as a result of a change in its price over an accounting period.
Valuation of Environmental Assets

Both the SNA and SEEA recommend asset valuation based on market prices. A range of techniques are used to approximate market values where prices are unavailable or unfit for purpose:

- **net present value**: resource rent derived using residual value method and discounted value of future benefits
- **rights-based valuation**: using tradeable rights to own or use an environmental asset (e.g. fishing rights)
- **appropriation method**: sum of revenue (taxes, levies, royalties) collected by government
Valuation of Environmental Assets

Measurement issues will be discussed in the next section.
Key Concepts

SEEA and SNA measure the same assets in monetary terms. SEEA uses asset accounts; SNA uses balance sheets:

- SEEA values expressed in physical and monetary terms
- the monetary account reflects a valuation of physical flows as recorded in the physical asset account
- measurement scope is broader in physical terms for some environmental assets