Introduction to Core Accounting Principles on SEEA and SNA

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Objectives of the Session

- Introduce and recall some fundamentals of national accounting
- Define the scope of measurement
  - Defining the economy and the environment
  - The production boundary
  - Economic units – sectors and industries
- Demonstrate the breadth of national accounting and the recording of stocks and flows
  - SNA and SEEA as frameworks for organizing information
Defining the Economy
Defining the “Economy”

- Economic activities
  - Production, Consumption, Accumulation

- Economic products
  - Goods and services

- Economic assets
  - Produced, Non-produced, Financial assets

- Economic units
  - Establishments, enterprises, households, governments

- Economic territory
  - Residence, geographic coverage
Constituents of an Economy?

**Institutional unit:** an entity capable of owning assets, incurring liabilities, carrying out economic activities taking decisions on all aspects of economic life and engaging in transactions with other entities.

**Economic Territory:** The geographic territory administered by the government of the country within which persons, goods, and capital can circulate freely.

The economic territory in which an institutional unit has its centre of predominant economic interest [2008 SNA] is the residence of the unit.

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Domestic Economy
# Residence

<table>
<thead>
<tr>
<th>Institutional units</th>
<th>Determined by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals</td>
<td>Residence of the household of which they form part</td>
</tr>
<tr>
<td>Unincorporated enterprises</td>
<td>If not a quasi-corporate, same residence as their owners</td>
</tr>
<tr>
<td>Corporations and NPIs</td>
<td>Normally the country of registration or where legally constituted. Branch in a different country → quasi-corporate in the host economy</td>
</tr>
<tr>
<td>(i) Owners of land, buildings &amp; immovable structures (ii) extractors of sub-soil resources.</td>
<td>Deemed always to have a centre of economic interest in the country where they are located. Thus, for all land &amp; buildings are owned by non-residents → a notional resident unit (with non-financial asset and direct investment liability)</td>
</tr>
</tbody>
</table>
Institutional Sectors

These are legal entities recognized by law. Includes *quasi-corporate*, which are not a legal entity.

This sector includes all resident household units (which are not legal entities) and all the unincorporated enterprises (not classified as corporation or quasi corporation) owned by them.
Enterprises, Establishments and Industries

- **Enterprises**
  - Institutional units from the perspective of being producers of goods and services

- **Establishments**
  - Enterprises in a single location performing a single or predominant type of productive activity

- **Industries**
  - Groupings of establishments undertaking similar types of productive activity
The Production Boundary

- “Production is an activity carried out … by an institutional unit that uses inputs of labour, capital and goods and services to produce outputs of goods and services” (2008 SNA, 6.24)

- In practice:
  - Exclude things you do only for yourself
  - Exclude household production of services for itself
    - Except rent of owner-occupiers & wages of domestic staff
  - Include household production of goods for itself
    - Agricultural products, fishing, fuelwood, clothes, furniture, water, energy
  - Include concealed and illegal activity
Product Flows in the SEEA

Economy
- Enterprises
- Households
- Government

Environment
- Mineral and energy resources
- Timber resources
- Fish resources
- Water resources
- Soil resources
- Land

Natural inputs (e.g. minerals, energy, timber, fish and water)

Residuals (e.g. air emissions, solid waste, return flows of water)

Products
Types of Output and Production

- **Market output**
  - Transactions between economic units at market prices

- **Non-market output**
  - Not transacted at market prices (government education, health)
  - Valued at cost of production

- **Own-account production in SNA (within establishments)**
  - For own final consumption (e.g. subsistence agriculture) : INCLUDED
  - For own final capital formation (e.g. building own house) : INCLUDED
  - For own intermediate consumption : EXCLUDED (except ancillary activity)
Own accounting production – recording in SNA and SEEA

- **SNA**
  - Recording is limited to the production of goods for own use
  - I.e. exclude own intermediate consumption

- **SEEA**
  - Record all own account and intra-establishment production and use of goods and services
  - I.e. include own intermediate consumption

- **Example**
  - Production of energy through the incineration of waste by an establishment for own intermediate consumption is recorded in SEEA but not in SNA
Key Messages

- Many aspects to defining the economy
- Measurement boundaries are important to understand
  - Production boundary key determinant of the size of GDP
- Own-account activity needs special consideration
- Economic (institutional) units can be seen from two key perspectives
  - Institutional sector: Similar economic behaviours / legal basis
  - Industry: Similar productive activities
Defining Environmental Assets
Discussion:

What “Things” Might be Considered Environmental Assets?
Definition of Environmental Assets

“Environmental assets are the naturally occurring living and non-living components of the Earth, together constituting the biophysical environment, which may provide benefits to humanity”
System of Environmental-Economic Accounting

One Environment : Two Perspectives

Individual environmental assets / resources

- Timber
- Water
- Soil
- Fish

Ecosystems

- Forests
- Lakes
- Agricultural areas
Scope of Individual Resources

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 resources and aquatic resources)

7 Water resources
   7.1 Surface water
   7.2 Groundwater
   7.3 Soil water
Physical and Monetary Scope

- In principle, when accounting for environmental assets in physical terms include all environmental assets whether or not they have a monetary value
  - All land in a country is included in physical land accounts
  - Also timber resources, other biological resources, soil, inland water resources
- Mineral and energy resources scope is known deposits
- Aquatic resources scope is all resources within EEZ plus rights on high seas
  - In practice limit to commercial stocks and subsistence
Key Points and Boundary Issues

- Distinct treatment of land
  - Account for its provision of space / area not the resources that are within it

- Include natural and cultivated biological resources

- Oceans and atmosphere excluded

- Stocks of potential energy from renewable sources excluded
  - E.g. solar, wind, tidal power
  - Slight exception for hydropower
Ecosystem Assets

- Areas comprising combinations of individual resources (timber, soil, water, etc) but also having ecological processes and characteristics

- Aim to assess
  - Condition of the ecosystem within an area (i.e. how is it functioning, quality of processes)
  - Flow of ecosystem services to economic and human activity

- Ecosystem asset accounting measures environmental impact rather than environmental pressures
Economic and Environmental Assets

**ECONOMIC ASSETS**
- Produced assets
  - Fixed assets & inventories
- Non-produced assets
  - Contracts, marketing assets, etc.
- Financial assets

**ENVIRONMENTAL ASSETS**
- Cultivated biological resources
- Natural resources & land

- Natural resources & land with no economic benefits (e.g. barren land, known mineral deposits without current economic value)
Key Messages

- Environmental assets can be seen from two perspectives: individual resources & ecosystems

- Both natural and cultivated resources are included in scope

- Scope is generally broader in physical terms than in monetary terms

- Land is accounted for in terms of area/space
The Structure of Accounts
System of Environmental-Economic Accounts (SEEA) view

- **Industries**
  - Industrial output of goods and services
  - Industrial intermediate demand
    - Environmental protection expenditures
  - Resource production by industries
  - Resource use by industries
  - Waste consumption by industries
  - Waste output by industries

- **Final demand**
  - Final demand
  - Environmental protection expenditures
  - Resource production by households/gov't
  - Resource use by households/gov't
  - Waste consumption by households/gov't
  - Waste output by households/gov't

- **Assets**
  - Financial and produced assets, opening balance
  - Natural resource assets, opening balance
  - Natural resource assets, closing balance
  - Financial and produced assets, closing balance
  - Changes in natural resource assets
  - Changes in and holding gains/losses on natural resource assets
  - Other changes in volume & holding gains/losses on financial & produced assets
  - Changes in and holding gains/losses on natural resource assets
  - Natural resource assets, opening balance
  - Natural resource assets, closing balance
Supply and Use Tables

- Matrices that record how supplies of different kinds of goods and services originate from domestic industries and imports and how those supplies are allocated between various intermediate or final uses, including exports.
- Involve the compilation of a set of integrated production and generation of income accounts for industries by drawing upon detailed data from industrial censuses or surveys.
- Provide an accounting framework within which the product flow method of compiling national accounts, whereby the total supplies and uses of individual types of goods and services have to be balanced with each other, can be systematically exploited.
Accounting and balancing identities

- **Supply and use identity**
  - Within the economy, the amount of a product supplied must also be used with the economy, most likely by a range of different economic units, or exported
  - Total supply of natural inputs = Total use of natural inputs
  - Total supply of products = Total use of products
  - Total supply of residuals = Total use of residuals

- **Input-output identity**
  - Over an accounting period, flows of materials into an economy must equal the flows of materials out of an economy plus any net additions to stock in the economy
## Basic Supply and Use Table, monetary terms

<table>
<thead>
<tr>
<th>Supply table</th>
<th>Industries</th>
<th>Households</th>
<th>Government</th>
<th>Accumulation</th>
<th>Rest of the world</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Products</td>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td>Imports</td>
<td>Total supply</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use table</th>
<th>Products</th>
<th>Intermediate consumption</th>
<th>Household final consumption</th>
<th>Government final consumption</th>
<th>Gross capital formation (incl. changes in inventories)</th>
<th>Exports</th>
<th>Total use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Value added</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Supply table – show the flows relating to the production, generation, and supply of natural inputs, products and residuals by different economic units by different economic units or the environment

<table>
<thead>
<tr>
<th>Natural inputs</th>
<th>Products</th>
<th>Residuals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Output (incl. sale of recycled and reused products)</td>
<td>D. Imports of products</td>
<td>E. Intermediate consumption of products; Use of natural inputs; Collection of residuals</td>
<td>A. Flows from the environment (incl. natural resource residuals)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Residuals</th>
<th>Total Use of Products (TUP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Residuals generated by industry (incl. natural resource residuals)</td>
<td>O. Residuals sent to the rest of the world</td>
</tr>
<tr>
<td>J. Residuals generated by household final consumption</td>
<td>P. Residuals received from the environment</td>
</tr>
<tr>
<td>K1. Residuals from scrapping and demolition of produced</td>
<td>M. Residuals recovered from the environment</td>
</tr>
<tr>
<td>K2. Emissions from controlled landfill sites</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use table</th>
<th>Total Use of Natural Inputs (TUNI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate consumption of products; Use of natural inputs; Collection of residuals</td>
<td>G. Gross Capital Formation (incl. fixed assets and inventories)</td>
</tr>
<tr>
<td>Final consumption*</td>
<td>H. Exports of products</td>
</tr>
<tr>
<td>Industries - classified by ISIC</td>
<td></td>
</tr>
<tr>
<td>Households</td>
<td></td>
</tr>
<tr>
<td>Industries - classified by ISIC</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total use</th>
<th>Total Use of Residuals (TUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. Collection and treatment of residuals (incl. accumulation in controlled landfill sites)</td>
<td>Q1. Direct from industry and households (incl. natural resource residuals &amp; landfill emissions)</td>
</tr>
<tr>
<td>O. Accumulation of waste in controlled landfill sites</td>
<td>Q2. Following treatment</td>
</tr>
<tr>
<td>Connections between SUT and asset accounts</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Industries</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Monetary supply and use table</td>
<td>Product-supply</td>
</tr>
<tr>
<td>Physical supply and use table</td>
<td>Product-use</td>
</tr>
<tr>
<td>Natural inputs-supply</td>
<td>Natural inputs-use</td>
</tr>
<tr>
<td>Product-supply</td>
<td>Product-use</td>
</tr>
<tr>
<td>Residual-supply</td>
<td>Residuals generated by industry</td>
</tr>
<tr>
<td>Residuals-use</td>
<td>Collection &amp; treatment of waste and other residuals</td>
</tr>
</tbody>
</table>

- **Monetary supply and use table**
- **Physical supply and use table**
- **Natural inputs-supply**
- **Product-supply**
- **Residual-supply**
- **Residuals-use**

- **Opening stock**
- **Gross capital**
- **Extracted natural resources**

**Other changes in volume of assets (e.g. natural growth, discoveries, catastrophic losses):**
- Revaluations
- Closing stock

**Physical supply and use table**
- **Monetary supply and use table**
- **Physical supply and use table**
- **Natural inputs-supply**
- **Product-supply**
- **Residual-supply**
- **Residuals-use**

**Asset accounts (Physical and monetary terms)**
- **Produced assets**
- **Environmental assets**

**Connections between SUT and asset accounts**
- **Monetary supply and use table**
- **Physical supply and use table**
- **Natural inputs-supply**
- **Product-supply**
- **Residual-supply**
- **Residuals-use**
Key Messages

▪ All economic stocks and flows can be organized and placed in context
▪ National accounting is not only output and intermediate consumption
▪ One account is not sufficient – different questions require a focus on different accounts and balancing items
▪ The accounting system is complete and internally consistent
The SEEA Central Framework Accounts

1. **Flow accounts**: supply and use tables for products, natural inputs and residuals (e.g. waste, wastewater) generated by economic activities.
   - physical (e.g. m² of water) and/or monetary values (e.g. permits to access water, cost of wastewater treatment, etc.)

2. **Stock accounts** for environmental assets: natural resources and land
   - physical (e.g. fish stocks and changes in stocks) and/or monetary values (e.g. value of natural capital, depletion)

3. **Activity / purpose accounts** that explicitly identify environmental transactions already existing in the SNA.
   - e.g. Environmental Protection Expenditure (EPE) accounts, environmental taxes and subsidies

4. **Combined physical and monetary accounts** that bring together physical and monetary information for derivation indicators, including depletion adjusted aggregates
### Physical flows accounts

<table>
<thead>
<tr>
<th>Physical flow accounts</th>
<th>Topics covered (detailed definition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full set of supply and use tables for materials</td>
<td>All resources and materials (energy, water, air emissions, water emissions, solid waste) (CF 3.45)</td>
</tr>
<tr>
<td>Economy-wide material flow accounts (MFA)</td>
<td>Supply and consumption of energy; air emissions, water emissions, and solid waste (CF 3.279)</td>
</tr>
<tr>
<td>Physical supply and use tables for water (PSUT water)</td>
<td>Supply (precipitation) and consumption of water (CF 3.186)</td>
</tr>
<tr>
<td>Physical supply and use tables for energy (PSUT energy)</td>
<td>Supply and consumption of energy (CF 3.140)</td>
</tr>
<tr>
<td>Air emissions accounts</td>
<td>Air emissions (CO2, pollutants) (CF 3.233)</td>
</tr>
<tr>
<td>Water emissions accounts</td>
<td>Water emissions (CF 3.257)</td>
</tr>
<tr>
<td>Waste accounts</td>
<td>Solid wastes (CF 3.268)</td>
</tr>
</tbody>
</table>

- CF = Central Framework, white cover edition, refers to paragraph number
## Asset accounts

<table>
<thead>
<tr>
<th>Asset accounts</th>
<th>Topics covered (detailed definition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral and energy resources</td>
<td>Physical and monetary accounts for minerals and energy stocks (oil, natural gas, coal and peat, non-metallic minerals and metallic minerals) (CF 5.172)</td>
</tr>
<tr>
<td>Land</td>
<td>Physical and monetary accounts for land, land cover, land use and forest (CF 5.235)</td>
</tr>
<tr>
<td>Soil resources</td>
<td>Area and volume of soil resources (CF 5.318)</td>
</tr>
<tr>
<td>Timber resources</td>
<td>Physical and monetary accounts for timber resources (CF 5.343)</td>
</tr>
<tr>
<td>Aquatic resources</td>
<td>Physical and monetary accounts for fish, crustaceans, molluscs, shellfish and other aquatic organisms such as sponges and seaweed as well as aquatic mammals such as whales. (CF 5.393) (CO2, pollutants) (CF 3.233)</td>
</tr>
<tr>
<td>Other biological resources</td>
<td>Cultivated animals and plants including livestock, annual crops such as wheat and rice, and perennial crops such as rubber plantations, orchards and vineyards. (CF 5.462)</td>
</tr>
<tr>
<td>Water resources</td>
<td>Stock of water resources (CF 5.471)</td>
</tr>
</tbody>
</table>
## Monetary flows accounts

<table>
<thead>
<tr>
<th>Monetary flow accounts</th>
<th>Topics covered (detailed definition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental protection expenditure accounts (EPEA)</td>
<td>Output of EP services in economy and expenditures on EP goods and services by resident units (CF 4.45)</td>
</tr>
<tr>
<td>Resource use and management accounts (RUMEA)</td>
<td>Production, supply and use, expenditures on and financing of resource management (CF 4.121)</td>
</tr>
<tr>
<td>Environmental goods and services sector (EGSS)</td>
<td>Characteristics of all producers of products intended for environmental protection and resource management (CF 4.95)</td>
</tr>
<tr>
<td>Environmentally related payments by government</td>
<td>Environmental subsidies, social benefits to households, investment grants and other current and capital expenditures (CF 4.138)</td>
</tr>
<tr>
<td>Environmentally related payments to government</td>
<td>Environmental taxes (taxes on products, production and income; other current taxes and capital taxes) and other payments to government (rent, sales of some goods and services, some fines and penalties) (CF 4.149, CF 4.159)</td>
</tr>
<tr>
<td>Permits and licenses to use environmental assets</td>
<td>Permits to extract and harvest natural resources (CF 4.174)</td>
</tr>
<tr>
<td>Emissions permits</td>
<td>Permits for the use of the environment as a pollution sink (emissions permits) (CF 4.182)</td>
</tr>
<tr>
<td>Costs related to termination of fixed assets</td>
<td>Environmental consequences of disposing of fixed assets (nuclear power plants, oil rigs and other equipment, landfills, mines, etc.) (CF 4.194)</td>
</tr>
</tbody>
</table>
THANK YOU