System of Environmental Economic Accounting
OTHER ACCOUNTS

Sokol Vako based on presentations from Sjoerd Schenau (Statistics Netherlands)
United Nations Statistics Division
Content

- Economy-Wide Material Flow Accounts
- Environmental activity accounts
Economy-Wide Material Flow Accounts
Introduction

- MFA = material flow accounting
- **Purpose:** to account for all relevant material flows within the economy, with the environment and the rest of the world
- In **physical units**
- Consistent with **System of national accounts**
- Policy relevant indicators
- Here focus is on **economy wide material flow accounts (EW-MFA):**
  1) good starting point,
  2) relative easy to compile,
  3) most common,
  4) Provides key indicators on resource productivity
EW-MFA and SDGs

**Goal 8.** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

<table>
<thead>
<tr>
<th>8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.4.1 Material footprint, material footprint per capita, and material footprint per GDP</td>
</tr>
<tr>
<td>8.4.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP</td>
</tr>
</tbody>
</table>
## EW-MFA and SDGs

**Goal 12.** Ensure sustainable consumption and production patterns

<table>
<thead>
<tr>
<th>12.2 By 2030, achieve the sustainable management and efficient use of natural resources</th>
<th>12.2.1 Material footprint, material footprint per capita, and material footprint per GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP</td>
<td></td>
</tr>
</tbody>
</table>
MFA in SEEA CF

- Describe all material flows
  a) from the environment to the economy,
  b) within the economy,
  c) from the economy to the environment
- In physical units (kg)
- Physical supply and use tables
MFA in SEEA CF

The purpose of economy-wide material flow accounts (EW-MFA) is to provide an aggregate overview, in tonnes, of the material inputs and outputs of an economy.

Inputs

• Domestic extraction
• Imports

Outputs

• Domestic processed outputs (residuals, emissions)
• Exports

→ So no recording of flows within the economy, no allocation to ISIC
Some key characteristics of EW MFA

• **All material flows** (excl. water and air)
• **Measurement unit**: metric tons per year
• **System boundaries** …
  - between the natural and the socio-economic system
    → **DE** = extraction or movement on purpose by human activity
    → **DPO** = materials on whose location, composition, transformation society looses control
  - between national economies: imports and exports
• **Stocks** within the socio-economic system:
  → Animal livestock (domestic)
  → Artefacts (buildings, infrastructure, machines, devices)
• **Flows** pass system boundaries
  → Inputs: domestic extraction; imports
  → Outputs: emissions, wastes, dissipative uses/losses; exports
• **Accounting identity**: inputs = outputs +/- stock changes
Concept: Material flow accounts

Rest of the world Environment and economy

Indirect flows related to imports

Imports

Indirect flows related to Exports

Exports

Domestic Environment

Domestic Extraction

Flows within the economy

Economy

Stocks

Unused materials

DMI

Domestic Processed Output (DPO)
EW MFA Indicators

• **DMI** (Direct Material Input) = Domestic Extraction (DE) + Imports
• **DMC** (Direct Material Consumption) = DMI – Exports
• **PBT** (Physical Trade Balance) = Imports – Exports
• **DPO** (Domestic Processed Outputs) = air and water emissions, (waste disposal), dissipative uses and losses
• **RMC** (Raw Material Consumption = resource footprint) = DE + Imports in RME – Exports in RME
• **RP** (resource productivity) = : GDP/DMC or GDP/RMC
ENVIRONMENTAL ACTIVITY ACCOUNTS
Introduction

SEEA CF:

• Physical flow accounts
• Asset accounts
• Environmental activity accounts

Environmental activity accounts: separately identify environmentally-related transactions presented in the existing SNA flow accounts in order to make them more explicit for analysis.

The scope of environmental activities include those economic activities whose primary purpose is to reduce or eliminate pressures on the environment or to make more efficient use of natural resources.

→ Environmental protection
→ Resource management

• Primary purpose criterion
Environmental protection and resource management

**Environmental protection**

- activities whose primary purpose is the prevention, reduction and elimination of pollution and other forms of degradation of the environment

  - Classified by environmental domain

**Resource management**

- activities whose primary purpose is preserving and maintaining the stock of natural resources and hence safeguarding against depletion.

  - Classified by type of resource
### Classification of environmental activities

<table>
<thead>
<tr>
<th>Group</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>I: Environmental protection (EP)</td>
<td>1 Protection of ambient air and climate</td>
</tr>
<tr>
<td></td>
<td>2 Wastewater management</td>
</tr>
<tr>
<td></td>
<td>3 Waste management</td>
</tr>
<tr>
<td></td>
<td>4 Protection and remediation of soil, groundwater and surface water</td>
</tr>
<tr>
<td></td>
<td>5 Noise and vibration abatement (excluding workplace protection)</td>
</tr>
<tr>
<td></td>
<td>6 Protection of biodiversity and landscapes</td>
</tr>
<tr>
<td></td>
<td>7 Protection against radiation (excluding external safety)</td>
</tr>
<tr>
<td></td>
<td>8 Research and development for environmental protection</td>
</tr>
<tr>
<td></td>
<td>9 Other environmental protection activities</td>
</tr>
<tr>
<td>II: Resource management (RM)</td>
<td>10 Management of mineral and energy resources</td>
</tr>
<tr>
<td></td>
<td>11 Management of timber resources</td>
</tr>
<tr>
<td></td>
<td>12 Management of aquatic resources</td>
</tr>
<tr>
<td></td>
<td>13 Management of other biological resources (excluding timber and aquatic resources)</td>
</tr>
<tr>
<td></td>
<td>14 Management of water resources</td>
</tr>
<tr>
<td></td>
<td>15 Research and development activities for resource management</td>
</tr>
<tr>
<td></td>
<td>16 Other resource management activities</td>
</tr>
</tbody>
</table>
Environmental activity accounts in SEEA-CF

- Environmental protection expenditure accounts (EPEA)
- Environmental goods and service sector (EGSS)
- Environmental taxes
- Environmental subsidies and similar transfers
- Environmental permits
ENVIRONMENTAL PROTECTION EXPENDITURE ACCOUNTS (EPEA)
ENVIRONMENTAL PROTECTION EXPENDITURE ACCOUNTS (EPEA)

- **Purpose**: to enable identification and measurement of society’s response to environmental concerns through the supply of and demand for environmental protection services.

- **EPEA** provide information on the *output* of environmental protection specific services produced across the economy and on the *expenditure* of resident units on all goods and services for environmental protection purposes.

- The EPEA is as a functionally oriented *satellite account* to the national accounts.
WHY EPEA?

To answer questions on economic efforts made by a country for environmental expenditure

- How much does a country spend for protecting the environment? (use side)
- Which is the size of the sector of the economy which carries out EP activities? (supply side)
- Who finances the national expenditure for EP? (financing perspective)
- Who pays for EP? (cost born by each sector of the economy)
TABLES OF EPEA

Four tables:

1. Combined production and generation of income account
2. Supply and use tables for specific services
3. National environmental expenditure account
4. Financing of National expenditure on environmental protection
Total national expenditure on environmental protection

<table>
<thead>
<tr>
<th>Type of expenditure by product</th>
<th>Specialist producers</th>
<th>Non-specialist and own-account producers</th>
<th>Other producers</th>
<th>Households</th>
<th>General government</th>
<th>NPISH</th>
<th>Total</th>
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<tbody>
<tr>
<td>Environmental protection specific services</td>
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<tr>
<td>Intermediate consumption</td>
<td>NI</td>
<td>4,000</td>
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<td>Final consumption</td>
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<td>4,770</td>
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<td>Gross fixed capital formation</td>
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<td>Connected products</td>
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<td>Adapted goods</td>
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</tr>
<tr>
<td>Intermediate consumption</td>
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<td>Final consumption</td>
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<tr>
<td>Gross fixed capital formation</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital formation for characteristic activities</td>
<td>2,100</td>
<td>2,500</td>
<td></td>
<td>2,100</td>
<td>6,500</td>
<td>3,700</td>
<td>3,570</td>
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</tbody>
</table>

Note: Dark grey cells are null by definition.

*N* means "not included in the derivation of total national expenditure on environmental protection".

* Non-profit institutions serving households.
Environmental Goods and Services Sector
EGSS

- **Supply side** of environmental activities $\rightarrow$ production of environmental goods and services

- **Aim:** assessing the contribution of EGSS to the total economy and its employment potential

- **Key indicators:**

  *Total production, total employment, total value added, total exports, total gross fixed capital*
Scope

The EGSS consists of producers of all environmental goods and services. Thus, all products that are produced, designed and manufactured for purposes of environmental protection and resource management are within scope of the EGSS.

- Environmental specific services, connected products, adapted goods and environmental technologies

- ‘Main purpose’ criterion (technical nature of product or activity / intension of the producer)
Methodology: activity approach versus product approach

- **Product approach**: Identify environmental goods and services in source data

- **Activity approach**: Identify environmental activities in source data

- **Data sources**: surveys (new or already existing), statistics, SNA, external reports

- **Netherlands**:
  - Many different environmental activities have been identified by Statistics Netherlands as EGSS activities
  - For every activity a specific methodology has been developed in order to compile the data
Environmental taxes
Definitions

- Taxes are compulsory, unrequited payments, in cash or in kind, made by institutional units to government units.
  - Taxes on products
  - Other taxes on production
  - Taxes on income
  - Other current taxes
  - Capital taxes
Definitions

• An *environmental tax* is a tax whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific, negative impact on the environment
  > Energy taxes
  > Transport taxes
  > Pollution taxes
  > Resource taxes
## Environmental taxes by type of tax

<table>
<thead>
<tr>
<th>Type of environmental tax</th>
<th>Taxes on products</th>
<th>Other taxes on production</th>
<th>Taxes on income</th>
<th>Other current taxes</th>
<th>Capital taxes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy taxes</td>
<td>10 800</td>
<td>1 500</td>
<td></td>
<td></td>
<td></td>
<td>12 600</td>
</tr>
<tr>
<td>Carbon taxes</td>
<td>4 600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 600</td>
</tr>
<tr>
<td>Taxes on fuel used for transport</td>
<td>4 700</td>
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<td></td>
<td></td>
<td></td>
<td>4 700</td>
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<tr>
<td>Other energy taxes</td>
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<td></td>
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<td>3 300</td>
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<td>Transport taxes</td>
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<td>800</td>
<td>1 400</td>
<td></td>
<td>100</td>
<td>4 900</td>
</tr>
<tr>
<td>Pollution taxes</td>
<td>400</td>
<td>500</td>
<td></td>
<td>200</td>
<td></td>
<td>1 100</td>
</tr>
<tr>
<td>Resource taxes</td>
<td>200</td>
<td>400</td>
<td></td>
<td>300</td>
<td></td>
<td>900</td>
</tr>
<tr>
<td><strong>Total environmental taxes</strong></td>
<td><strong>14 000</strong></td>
<td><strong>3 200</strong></td>
<td></td>
<td><strong>1 900</strong></td>
<td><strong>400</strong></td>
<td><strong>19 500</strong></td>
</tr>
<tr>
<td>Non-environmental taxes</td>
<td>79 000</td>
<td>15 400</td>
<td>23 000</td>
<td>74 000</td>
<td>5 800</td>
<td>198 800</td>
</tr>
<tr>
<td><strong>Total taxes</strong></td>
<td><strong>93 000</strong></td>
<td><strong>18 600</strong></td>
<td><strong>23 000</strong></td>
<td><strong>74 000</strong></td>
<td><strong>7 700</strong></td>
<td><strong>218 300</strong></td>
</tr>
</tbody>
</table>

**Share of environmental taxes (percentage)**

- Energy taxes: 17.7%
- Carbon taxes: 20.8%
- Taxes on fuel used for transport: 0.0%
- Other current taxes: 0.0%
- Capital taxes: 32.8%
- Total: 25.0%
- Environmental taxes: 9.8%
Approach

• Starting point: All government levies (national, subnational)
• I. Identification of tax base(s); environmentally-related levies
• II. Distinction between environmental taxes and environmentally related payments
• III. Allocation to environmental tax groups
• IV. Allocation to the final tax payer

• Data Sources: Tax statistics, government finance statistics, national accounts
THANK YOU

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