SEEA CF, EW MFA and the SDG indicators for domestic material consumption and material footprint

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EGM on “Resource Efficiency in the Arab Region: Monitoring Progress of SDG 12 and Building Back Better from COVID-19”
SDG indicators 8.4 and 12.2, EW-MFA and SEEA CF - Logically connected and major overlap

Slightly different definitions/pragmatic adaptations

SEEA CF Physical flow accounting

Economy wide material flow accounting

Modelling of footprint

Indicators
Target 8.4 Improve progressively, through 2030, global resource efficiency in consumption and production ...

Target 12.2 By 2030, achieve the sustainable management and efficient use of natural resources

Monitored by the same two indicators for material use:

**Indicator 8.4.1/12.2.1:** Material footprint, per capita, per GDP

**Indicators 8.4.2/12.2.2:** Domestic material consumption, DMC, per capita, per GDP
Indicator 8.4.2 + 12.2.2

Domestic Material Consumption, DMC

DMC
= Domestic extraction of natural resources
+ imports of goods
- exports of goods

Measures the direct consumption of materials by the domestic economy – tonnes per year

All types of natural resources/goods are taken into account and added up, except water

Tier I indicator
Indicator 8.4.1 + 12.2.1
Material footprint

Material footprint
= Domestic extraction of natural resources
  + RME (imports of goods)
  - RME (exports of goods)  

RME – Raw material equivalents

Measures the global natural resource extraction (Raw Material Equivalents) generated by the domestic final demand of a country. Includes all resources around the globe needed for the production of imports and exports. Tonnes per years.

Builds on the DMC, but requires modeling (multi regional input–output), assumptions, international databases for resource extraction in all countries

Tier II indicator
The Economy wide – material flows accounts framework, EW-MFA is the basis for the DMC and the material footprint (RME) indicators

- EW-MFA: accounting rules, identities, classifications and a number of indicators (including DMC) – tonnes per year

- Breakdown by various types of materials (biomass, metal ores, non-metalic minerals, fossil energy)

- Accounts for material inputs to the economy and material outputs from the economy. Also accumulation of materials within the economy is taken into account.

- Inter-industry, etc. flows within the economy are not recorded

- Water and air are excluded (except for some balancing items).
Scope of Economy Wide Material Flow Accounts

DE + Imports + Input Balancing Items = Exports + DPO + Output Balancing Items + NAS

Different stages of EW-MFA

• Direct physical flows: Domestic extraction, imports and exports
  => Domestic material consumption, DMC

• Raw material equivalents of trade
  => Material footprints – requires modelling

• Material outflows (waste, air emissions, etc.)
  => Domestic processed output

• Accumulation in the economy – additions to stocks
Chapter 3 Physical flow accounting

Physical supply–use tables
(inspired by the national accounts)

Describe physical flows
• From the environment to the economy
• From the economy to the environment
• Within the economy

Measuring units: Tonnes, Joules, cubic metres
(depends on purpose)
Scope of SEEA CF physical flow accounting

Economy – Environment

Figure 2.1
Physical flows of natural inputs, products and residuals

Natural inputs
Products
Residuals

Source: SEEA CF
### Physical supply table - example

<table>
<thead>
<tr>
<th>Supply table</th>
<th>Industrial branches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agric.</td>
</tr>
<tr>
<td>Products</td>
<td></td>
</tr>
<tr>
<td>Agricultural pr</td>
<td>39</td>
</tr>
<tr>
<td>Mining pr</td>
<td>0</td>
</tr>
<tr>
<td>Industry pr</td>
<td>0</td>
</tr>
<tr>
<td>Services</td>
<td>0</td>
</tr>
<tr>
<td>Residuals</td>
<td></td>
</tr>
<tr>
<td>Sol. waste</td>
<td>4</td>
</tr>
<tr>
<td>Airemiss</td>
<td>10</td>
</tr>
<tr>
<td>Resources</td>
<td></td>
</tr>
<tr>
<td>Balance item</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
</tr>
</tbody>
</table>

Physical use table - example

<table>
<thead>
<tr>
<th>Use table</th>
<th>Industrial branches</th>
<th>Final demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural pr</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Mining pr</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Industry pr.</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Services</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Residuals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sol. waste</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>108</td>
</tr>
<tr>
<td>Balance item</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Supply is equal to use

Various balances in the supply and use tables

*Balances for matter:*
- Supply of products = use of products
- Supply of natural inputs = use of natural inputs
- Supply of residuals = use of residuals
- Total supply = total use

*Balances for industries and households:*
Total inputs = total outputs
Advantages of SEEA CF physical accounts (supply-use tables)

• Accounting and classification rules provide link to the national accounts and to the input-output tables (useful for analysis, modelling and estimations of footprints)

• Provides an overall framework that is broader than the EW-MFA (include the flows within the economy – production, consumption, accumulation)

• The same conceptual framework can be used for materials, water, energy air emissions and waste, etc.
Implementation of SEEA CF physical supply and use tables

• Quite **costly and demanding** to construct complete physical supply and use tables including all natural inputs, products and residuals

• Instead tables **for specific parts or partial tables may be constructed**, e.g. physical supply and use tables for energy, water, waste, or air emissions

• **EW-MFA and estimation of DMC (SDG indicator 12.2.2) can be seen as a first pragmatic step**