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

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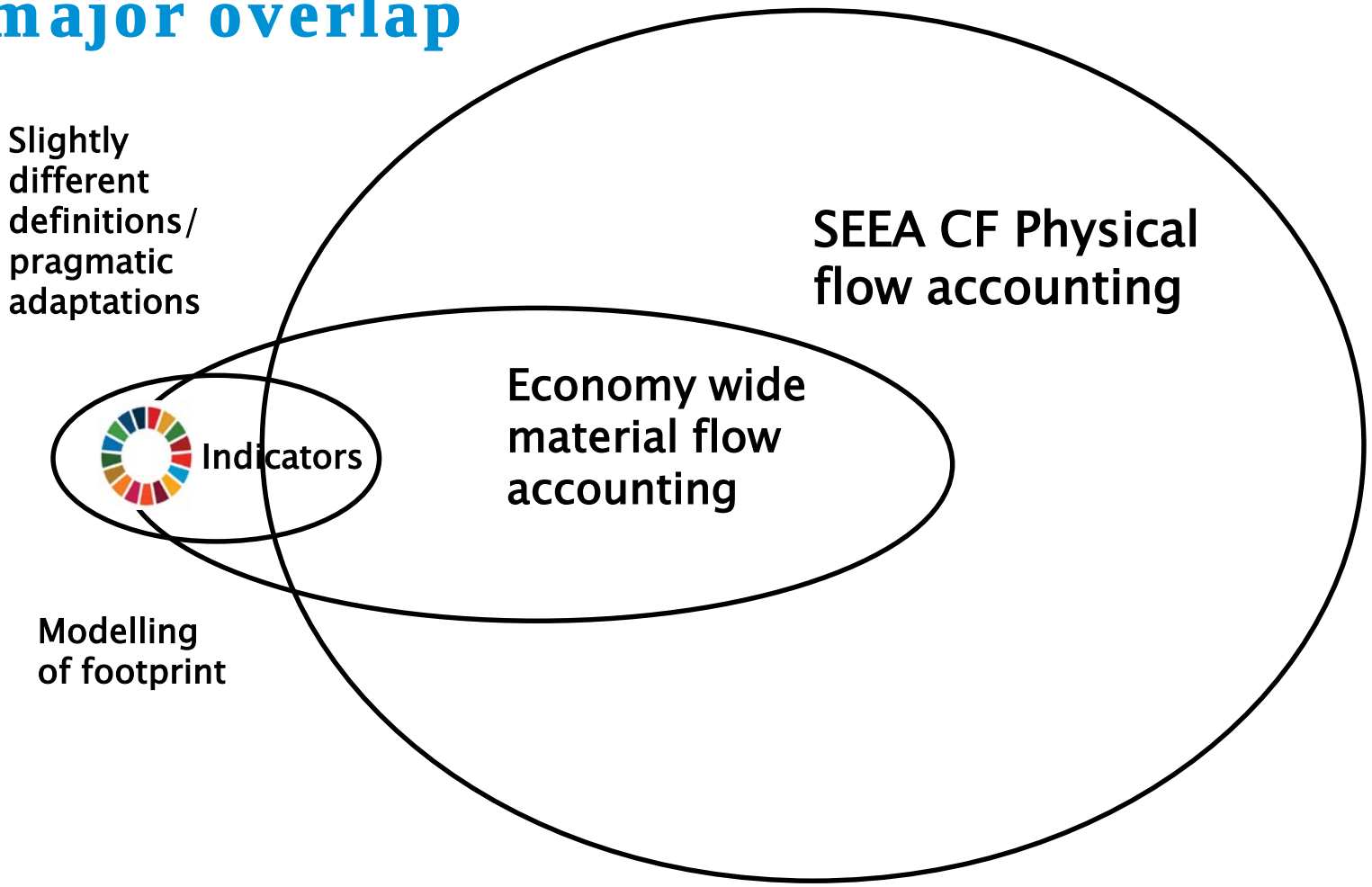
EGM on “Resource Efficiency in the Arab Region: Monitoring Progress of SDG 12 and Building Back Better from COVID-19”

STATISTICS DENMARK

SDG indicators 8.4 and 12.2, EW-MFA and SEEA CF - Logically connected and major overlap



SDG - goals, targets and indicators

Target 8.4 Improve progressively, trough 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.

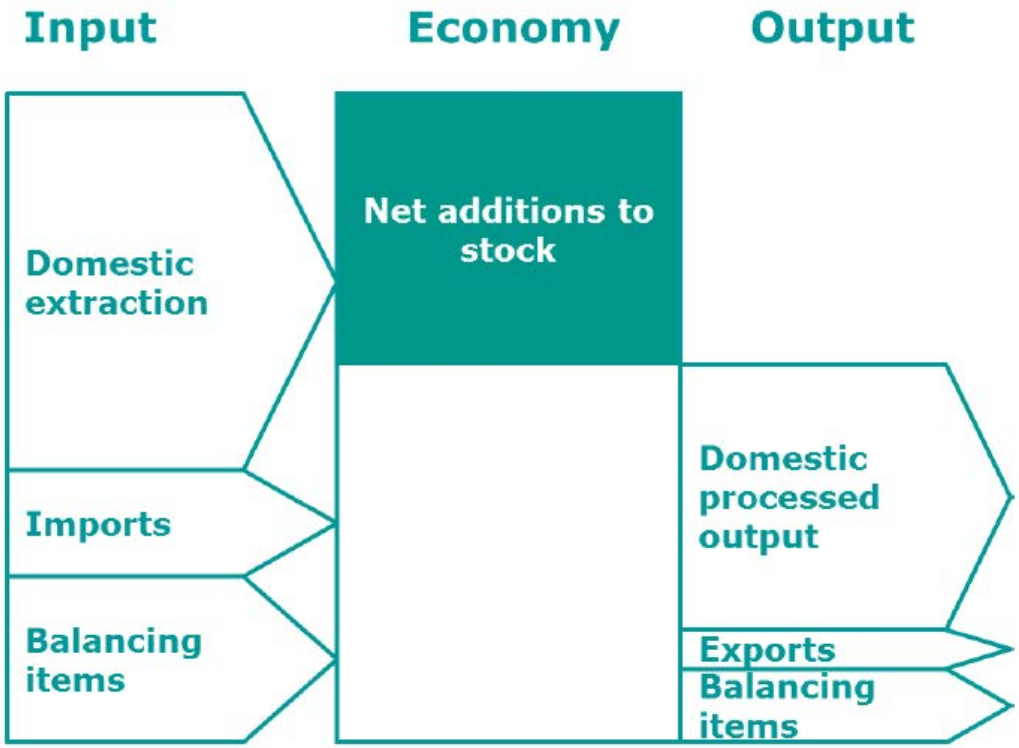
Builds on the DMC, but **requires modeling** (multi regional input-output), assumptions, international databases for resource extraction in all countries

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

Source: Economy wide material flow accounts – Handbook, 2018 edition, Eurostat

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**

System of Environmental-Economic Accounting – Central Framework

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

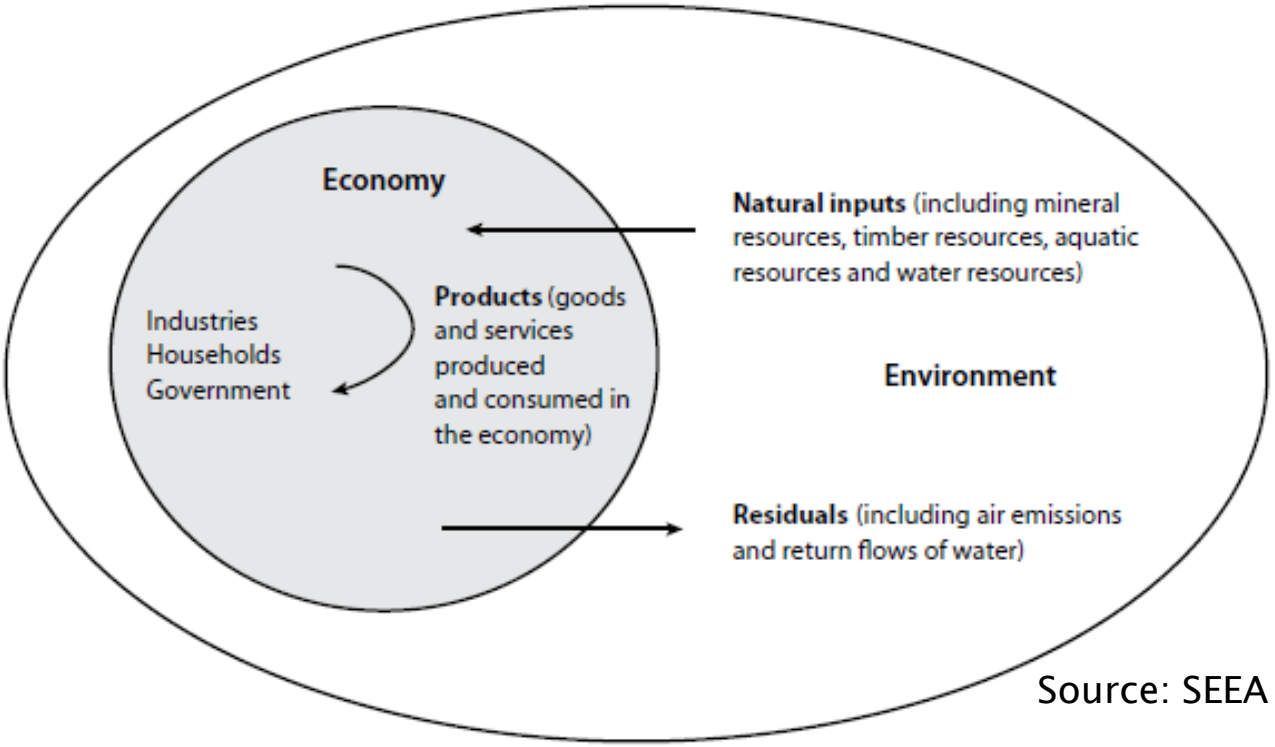
Economy – Environment

Natural inputs

Products

Residuals

Figure 2.1
Physical flows of natural inputs, products and residuals



Source: SEEA CF

Physical supply table - example

Outputs from

	Supply table		Industrial branches				Industries	Imports	Consump-tion, etc.		Environ-ment	
			Agric.	Mining	Indus.	Serv.	Import	Cons.	Accum.		Envir.	Total
Products	Products	Agricultural pr	39	0	0	0	24					63
		Mining pr	0	113	4	4	156					277
		Industry pr.	0	0	218	6	144					368
		Services	0	0	0	0	0					0
Residuals	Residuals	Sol. waste	4	0	48	7	1	8		1		69
		Air emiss	10	3	141	57	0	37				248
Natural inputs	Resources										148	148
	Balance item		14		6			9				29
	Total		67	116	417	74	325	54		1	148	

Source: Delahaye, R. et al. Statistics Netherlands: Material Flow Monitor

Physical use table - example

Inputs to

Industries | Consump-tion, etc. | Exports | Environ-ment

Use table		Industrial branches				Final demand				
		Agric.	Mining	Indus.	Serv.	Cons.	Export	Inves.	Accum.	Total
Products	Agricultural pr	2	0	35	1	6	19	0		63
	Mining pr	2	8	185	11	1	70	0		277
	Industry pr.	12	0	117	28	47	160	4		368
	Services	0	0	0	0	0	0	0		0
Residuals	Sol. waste	1	0	43	12	0	13	0		69
Resources		40	108	0	0					148
Balance item		10	0	37	22				208	277
Total		67	116	417	74	54	262	4	208	

Source: Delahaye, R. et al. Statistics Netherlands: Material Flow Monitor

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**