

System of Environmental Economic Accounting



System of
Environmental
Economic
Accounting

OTHER ACCOUNTS

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United Nations Statistics Division



United Nations

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

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

8.4.1 Material footprint, material footprint per capita, and material footprint per GDP

8.4.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP

EW-MFA and SDGs

Goal 12. Ensure sustainable consumption and production patterns

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

12.2.1 Material footprint, material footprint per capita, and material footprint per GDP

12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP

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

	Industries	Households	Accumulation	Rest of the world	Environment	Total
Supply table						
Natural inputs					Flows from the environment	Total supply of natural inputs
Products	Output			Imports		Total supply of products
Residuals	Residuals generated by industry	Residuals generated by final household consumption	Residuals from scrapping and demolition of produced assets			Total supply of residuals
Use table						
Natural inputs	Extraction of natural inputs					Total use of natural inputs
Products	Intermediate consumption	Household final consumption	Gross capital formation	Exports		Total use of products
Residuals	Collection and treatment of waste and other residuals		Accumulation of waste in controlled landfill sites		Residual flows direct to environment	Total use of residuals

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

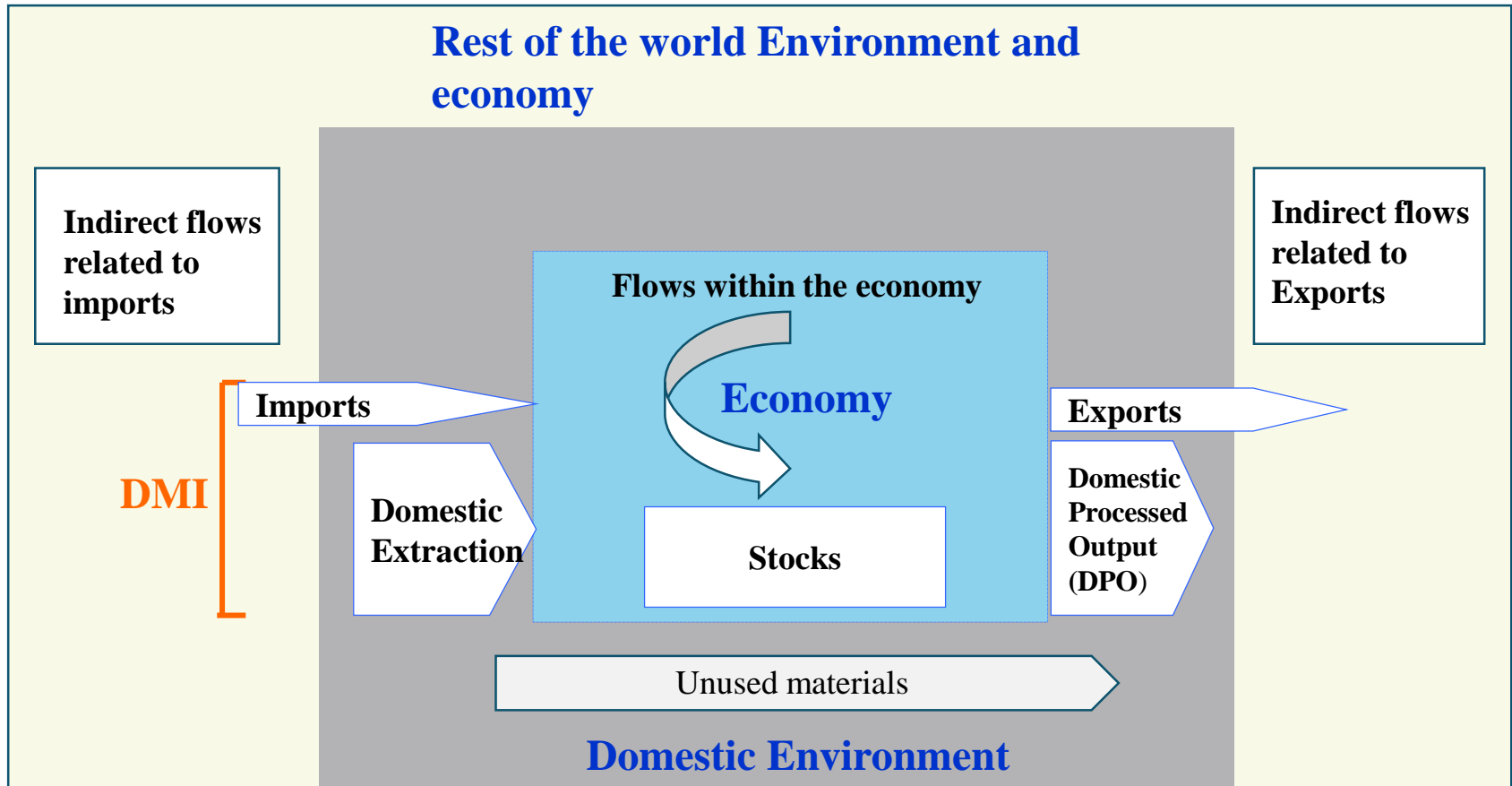
- Domestic processed outputs (residuals, emissions)
- Exports

→ 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 loses 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:** $\text{inputs} = \text{outputs} \pm \text{stock changes}$

Concept: Material flow accounts



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

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



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

	Users						
	Industry			Households	General government	NPISH ^a	Total
	Producers of environmental protection specific services		Other producers				
	Specialist producers	Non-specialist and own-account producers					
Type of expenditure by product							
Environmental protection specific services							
Intermediate consumption	NI	4 000	3 400				7 400
Final consumption				2 970	1 800		4 770
Gross fixed capital formation	NI		100				100
Connected products							
Intermediate consumption	NI		200				200
Final consumption							
Gross fixed capital formation	NI						
Adapted goods							
Intermediate consumption	NI						
Final consumption				600			600
Gross fixed capital formation	NI						
Capital formation for characteristic activities	2 100	2 500					4 600
Transfers for environmental protection not included above							
Environmental protection transfers to and from the rest of the world (net)					200		200
Total national expenditure on environmental protection	2 100	6 500	3 700	3 570	2 000		17 870

Note: Dark grey cells are null by definition.

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

^a Non-profit institutions serving households.

Environmental Goods and Services Sector

EGSS

- **Supply side** of environmental activities → 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

Environmental taxes by type of tax

Type of environmental tax	Type of tax						Total
	Taxes on products	Other taxes on production	Taxes on income		Other current taxes	Capital taxes	
			Corporations	Households			
Energy taxes	10 800	1 500				300	12 600
Carbon taxes	4 600						4 600
Taxes on fuel used for transport	4 700						4 700
Other energy taxes	1 500	1 500				300	3 300
Transport taxes	2 600	800			1 400	100	4 900
Pollution taxes	400	500			200		1 100
Resource taxes	200	400			300		900
Total environmental taxes	14 000	3 200			1 900	400	19 500
Non-environmental taxes	79 000	15 400	23 000	74 000	5 800	1 600	198 800
Total taxes	93 000	18 600	23 000	74 000	7 700	2 000	218 300
Share of environmental taxes (percentage)	17.7	20.8	0.0	0.0	32.8	25.0	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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