



Exercise 4d.1: Assigning macro-level resource use indicators

Estimated time requirement: 20 minutes

Introduction

Indicators are important instruments for monitoring and evaluating the progress made towards resource efficiency and circular economy. While indicators can be used at various levels (micro, meso, macro), many countries have started to define metrics for measuring resource use at the national level. Resource use indicators are essential to conducting Material Flow Analysis (MFAs), which typically distinguishes between 6 different kinds of metrics: total material requirement (TMR), total material input (TMI), direct material input (DMI), domestic material consumption (DMC), total domestic output (TDO) and total material output (TMO). For definitions, please have a look at table 1. When measuring a country's GDP in relation to its DMC, we can derive an indication about the degree of resource productivity and economic decoupling. To account for the indicators various data sources can be used. Most material flows are statistically observed, while other, indirect flows associated to exports or imports must be estimated. After completing this exercise, you will be familiar with the terminology of resource use indicators and with possible data sources to determine material flows.

Structure of exercise

Part	Task	Time
1	Please form groups of 2-3 people and examine the template on the next page. Based on the definition presented in table 1, please allocate the 6 macro-level indicators (TMO, TMI, DMC, TDO, DMI, TMR) to the slots 1-5 in figure 1 on worksheet 1.	10 min
2	To account for material inputs and output several data sources are available, some of those are listed on worksheet 2. Match the option to the categories material input or material output and think of two additional data sources to add.	10 min

Background information

Indicator	Definition
Total material requirement (TMR)	= Indirect flows of imports + imports + used domestic extraction + unused domestic extraction
Total material input (TMI)	= Total material requirement - indirect flows of imports
Direct material input (DMI)	= Total material input - unused domestic extraction
Domestic material consumption (DMC)	= Direct material input - exports
Total domestic output (TDO)	= Domestic material consumption + unused domestic extraction
Total material output (TMO)	= Total domestic output + exports



A country's **resource productivity index** can provide insights into the degree of **economic decoupling**:

- **Consumption-based** resource productivity index = GDP/DMC
- **Production-based** resource productivity index = GDP/DMI

Figure 1: Definitions of resource use indicators applied in MFAs



Worksheet 1

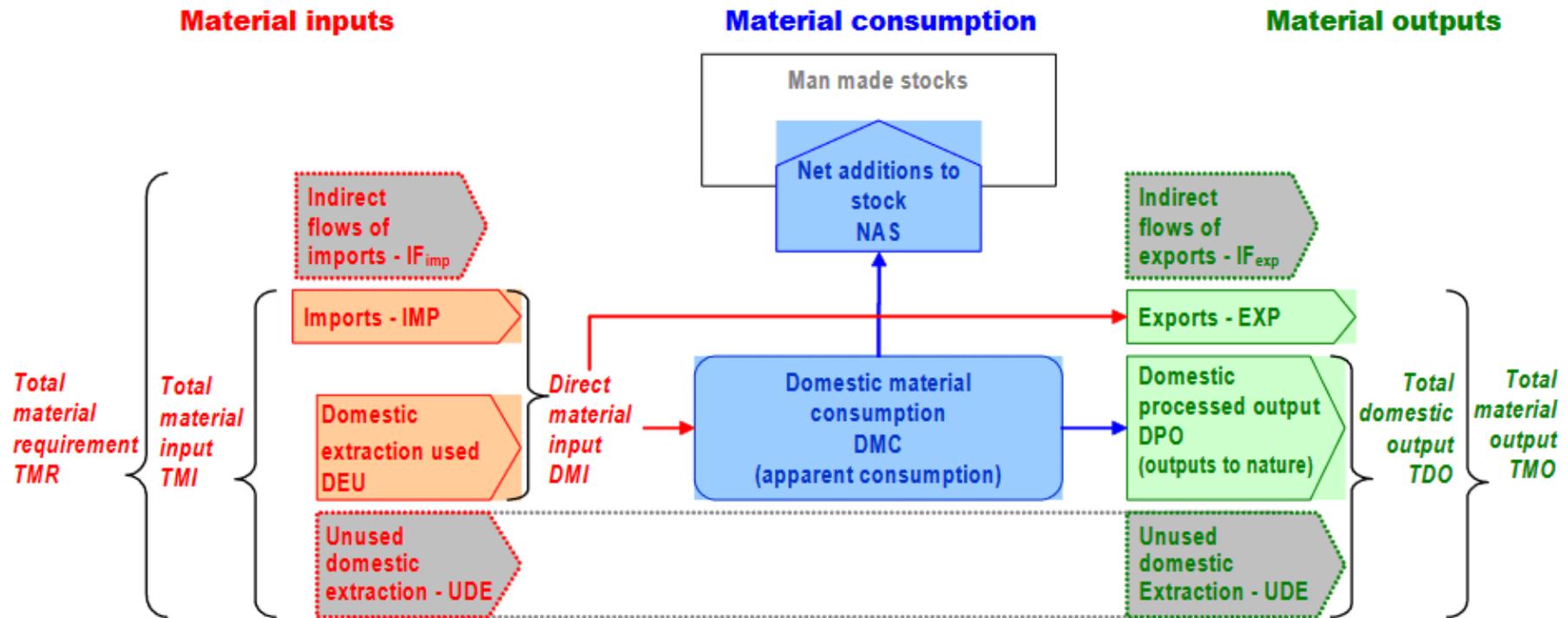


Figure 2: Exercise template for allocation of resource use indicators (source: <https://www.oecd.org/environment/indicators-modelling-outlooks/MFA-Guide.pdf> (adapted))

- See also <https://www.oecd.org/environment/indicators-modelling-outlooks/MFA-Guide.pdf>, p. 19

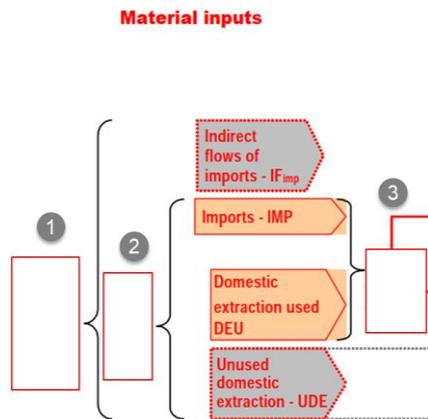


Worksheet 2

Data Sources

Agricultural statistics (cereals, vegetables etc. produced)	Environmental accounts for air emissions	Energy statistics and balances (extraction of fuels)
Energy statistics (emission inventories)	Forestry statistics (timber harvested)	Agricultural statistics for fertilizer use

Data Sources for Material Input:



1. Forestry statistics (timber harvested)

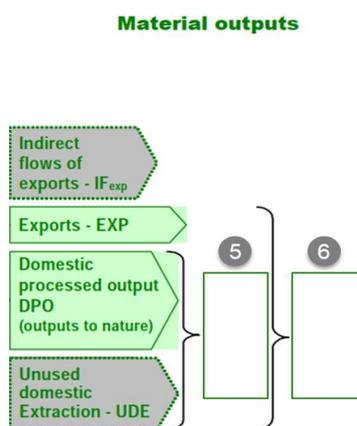
2. Energy statistics and balances (extraction of fuels)

3. Agricultural statistics (cereals, vegetables etc. produced)

4. Statistics for foreign trade (imports)

5. Statistics for foreign trade (imports)

Data Sources for Material Output:



1. Environmental accounts for air emissions

2. Agricultural statistics for fertilizer use

3. Energy statistics (emission inventories)

4. Statistics for foreign trade (exports)

5. Environmental statistics for waste water and solid waste disposal

- See also <https://ec.europa.eu/eurostat/documents/1798247/6191533/3-Economy-wide-material-flow-accounts...-A-methodological-guide-2001-edition.pdf> p. 47