

OECD-UNEP Conference on Resource Efficiency
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Module 1

Improving Knowledge: Material Flows Analysis and Indicators

Progress of MFA from knowledge to policies - Experiences in Japan and international activities-

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Inaugural member, International Panel for Sustainable Resource Management

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- **Progress in international activities**
 - ◆ Interaction between methodological experts and policy users
 - ◆ Interaction between international activities and nation-specific progress
 - ◆ Progress in expert communities, ConAccount, ISIE, etc.
 - ◆ Major outcomes from OECD/Japan Seminar in September 2007

- **Japanese experiences**
 - ◆ Policy use of macro MF indicators: Numerical targets in Japanese Fundamental Plan for Sound Material-Cycle Society
 - ◆ Use of MF approach in industries (e.g. in environmental reporting)

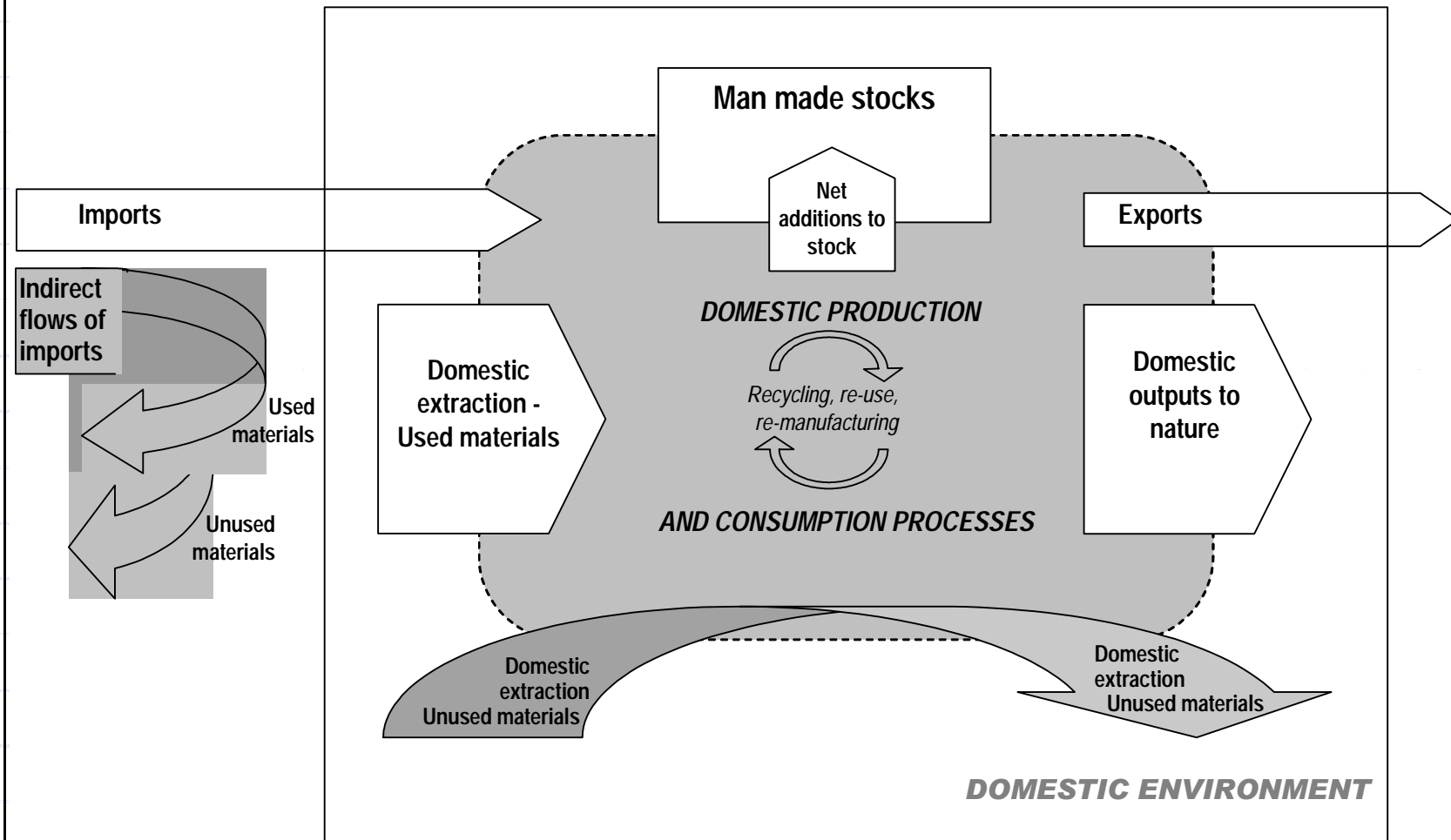
- **Methodological issues to be further elaborated**
 - ◆ Integration among family of MFA tools
 - ◆ Key methodological questions to meet policy needs

Chronology of international interactions(-2000)

- 1991 The term “Junkan-gata-shakai (Sound Material-cycle Society)” was proposed by an expert committee of Japan Environment Agency
- Since 1992 Material balance of Japan has been published on “White paper” (Quality of the Environment Report)
- Mid 1990s European experts noticed Japanese activity
- 1995 SCOPE Workshop on Indicators of Sustainable Development at Wuppertal Institute
Initiation of International joint study (GER, JPN, USA, NET, +AUT)
- Late 1990s, WRI reports (Resource Flows, The Weight of Nations)
Methodological progress in ConAccount, ISIE, etc.
- 2000 OECD MFA Seminar
- 2000 Fundamental Law for a Sound Material Cycle Society

Schematic representation of material flows

1a. Economy-wide material balance scheme



REST OF THE WORLD ENVIRONMENT AND ECONOMY

Source: OECD.

Key international activities for MFA

Research community

- International Joint Study (AUT,GER,JPN,NET,USA)
- ConAccount
- Gordon Conference on Industrial Ecology
- ISIE(International Society for Industrial Ecology)

International organizations

- OECD(EA, Waste prevention, De-coupling indicator, Council recommendation on MF & RP)
- EEA/ETCWMF(ETCRWM)
- EUROSTAT: Methodological guide
- UNSTAT:SEEA

Material flow related analyses and associated issues of concern

Issues of concern	Specific concerns related to environmental impacts, supply security, technology development			General environmental and economic concerns related to the throughput		
	within certain businesses, economic activities, countries, regions			of substances, materials, manufactured goods		
	<i>associated with</i>			<i>at the level of</i>		
Objects of primary interest	Substances	Materials	Manufactured goods	Businesses	Economic activities	Countries, regions
	chemical elements or compounds e.g. Cd, Cl, Pb, Zn, Hg, N, P, C, CO ₂ , CFC	raw materials and semi-finished goods e.g. energy carriers, metals (ferrous, non-ferrous), sand and gravel, timber, plastics	e.g. batteries, cars, computers	e.g. firms, companies, plants, medium sized and big enterprises, MNEs	e.g. production sectors, chemical industry, iron and steel industry, construction, mining	e.g. aggregate mass of materials (& related materials mix), groups of materials, selected materials
Type of analysis	Ia Substance Flow Analysis	Ib Material System Analysis	Ic Life Cycle Analysis	IIa Business level MF analysis	IIb Input-Output Analysis	IIc Economy-wide MF Analysis
	⇕	⇕	⇕	⇕	⇕	⇕
Type of measurement tool	Substance Flow Accounts	Individual Material Flow Accounts ⚙	Life Cycle Inventories (MF Inventories)	Business Material flow accounts	Physical Input-Output Tables ⚙ ⊙, NAMEA-type approaches ⊙	Economy-wide Material Flow Accounts ⚙

⚙: MFA tools using the materials balance principle. ⊙: MFA tools using national accounting principles fully in line with the SEEA.
Source: OECD, based on Bringezu and Moriguchi 2002.

Chronology of international interactions(2000-)

- 2000 Fundamental Law for a Sound Material Cycle Society
- 2003 MF Indicators and targets in 1st Japanese SMCS plan
- 2003 Japanese proposal at G8 meeting (MFA studies)
- 2004 OECD Council Recommendation
- 2004-2006 OECD MFA WS in Helsinki, Berlin, Rome
- 2004 Japanese proposal at G8 summit (3R initiative)
- 2005 3R Ministerial (OECD's proposal to host this Conference)
- 2007 OECD/Japan Seminar for MF/RP
- 2007 Inaugural meeting of Resource Panel
- 2008 March: 2nd Japanese SMCS plan
(revised indicators, incl. monitoring of TMR)
April: OECD-UNEP Conf., OECD/EPOC Ministerial
May-July: G8 Env. Ministerial, G8 Summit

Major outcomes from OECD/Japan Seminar

Desirable developments and direction for next steps

- Key priorities –

- Monitoring International trade and hidden flows
- Monitoring the environmental impacts of different material flow categories
- Monitoring the economic and environmental performance of 3R-related activities
- Fostering the use of resource productivity indicators
- Providing disaggregated accounting and information
- Upgrading the extent and quality of material flow data

The Way Forward

- Fostering collaboration among research, policymaking and statistics
- Enhancing cooperation in the international context
- Towards the G8 2008 summit

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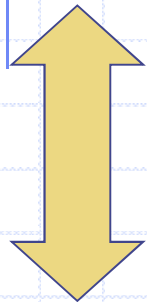
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Why do material flows matter ?

➤ **Dematerialization**

Total size of MF, scarcity of resources, scarcity of waste dumping site, etc.



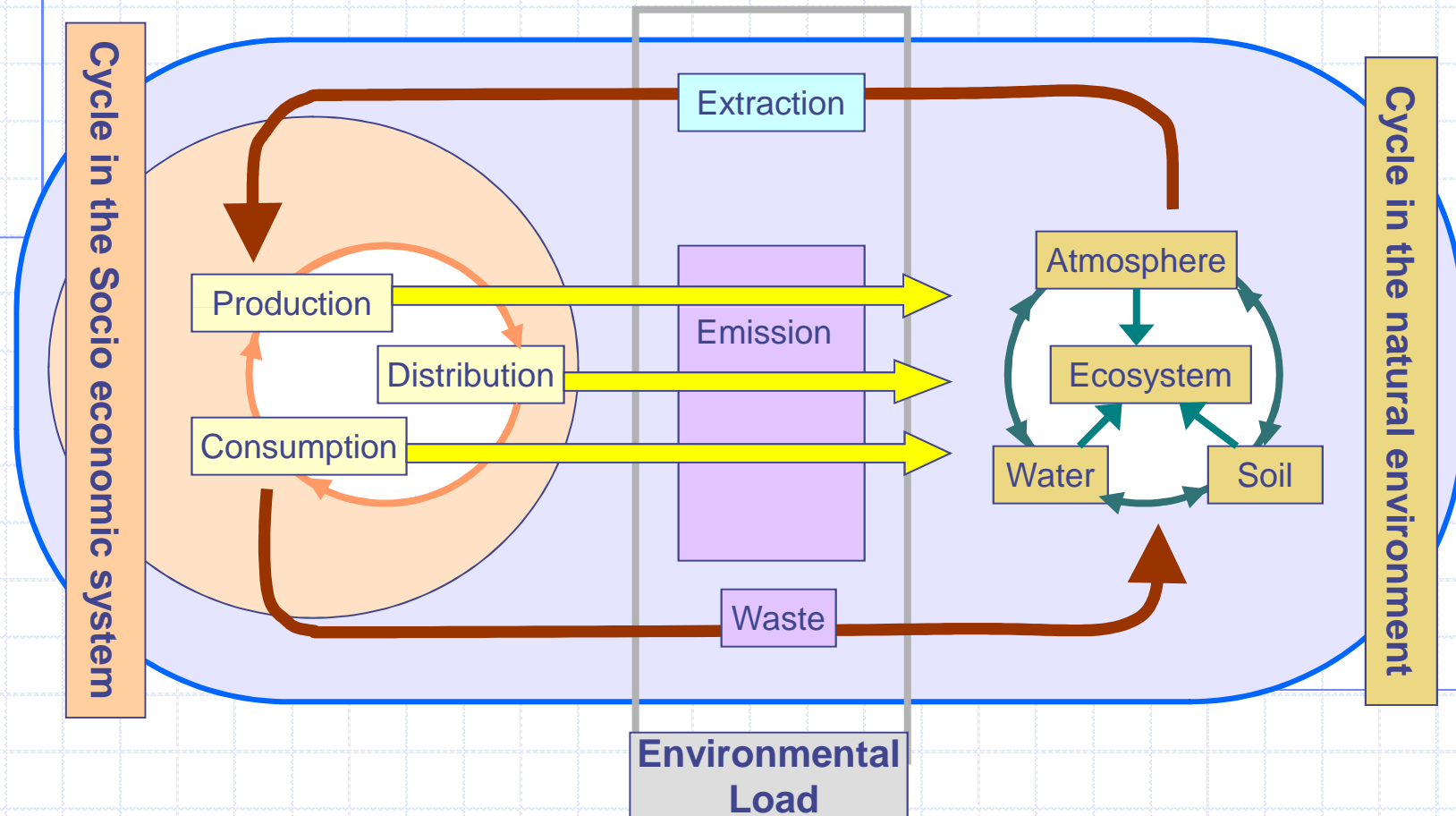
Proxy of environmental impacts ?

Common background of environmental problems?

➤ **Detoxification**

Minimization of use and release of critical (hazardous) substances

Material Cycle in the Socio-Economic System and Material Cycle in the Natural Environment



Alternative views to rationalize the need to reduce the total requirement for materials

In addition to resource issues (price, scarcity, equitable use, etc.), we have rationale from perspectives of environmental impacts.

- We need to reduce the massive environmental pressures in material resources extraction
- Dematerialization directly contributes to prevention of the generation of massive solid wastes at the end-of-life of material resources
- Dematerialization contributes to a reduction of life-cycle energy consumption, greenhouse gas emissions, and other environmental impacts.

Transition of socio-economic structure

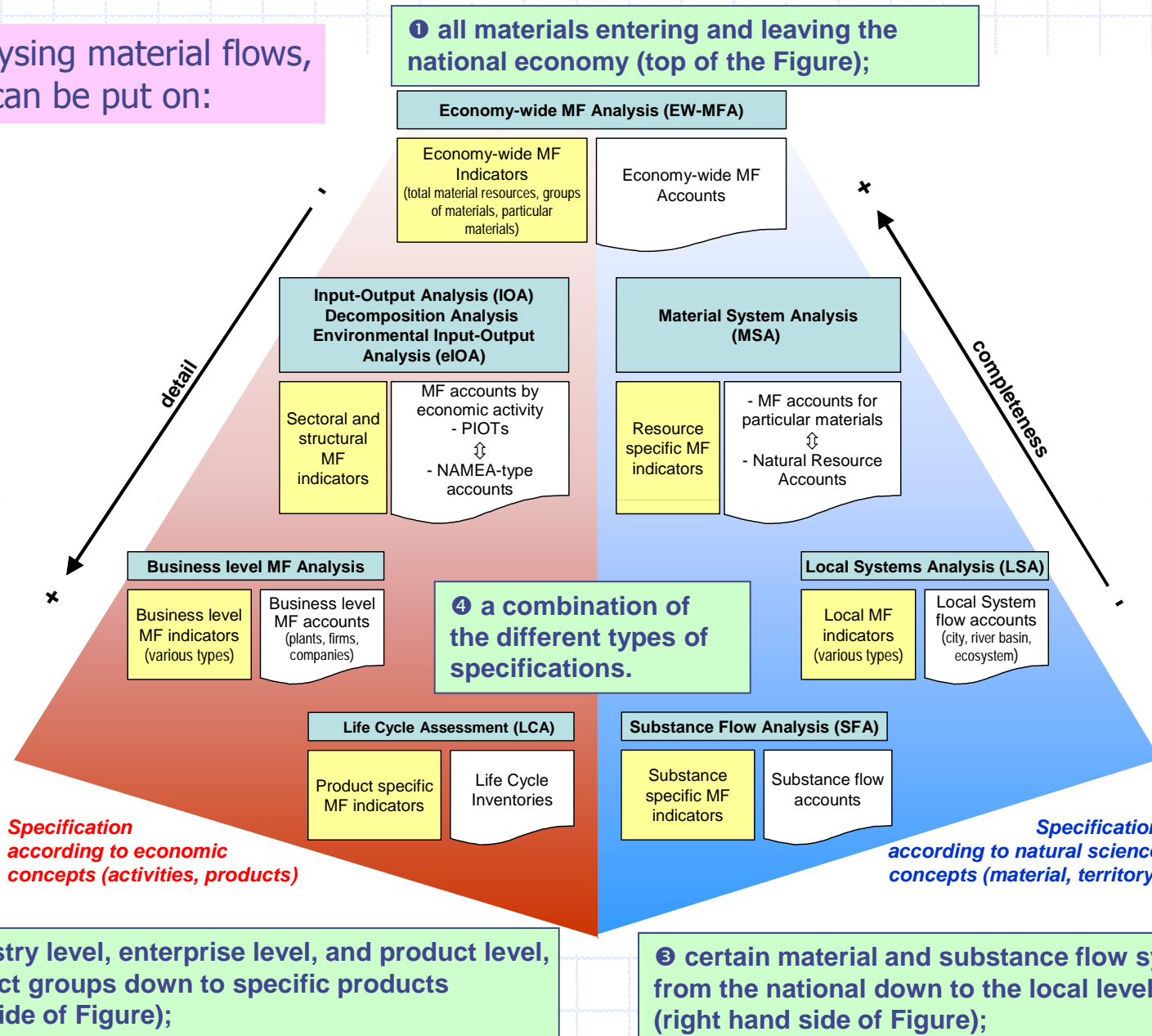
Mass-production,
mass-consumption,
mass-disposal society

Sound material cycle
society (SMCS)



Architecture and level of application of MFA tools

When analysing material flows, emphasis can be put on:



Key methodological questions to meet policy needs

- Attribution of MFs to national production or consumption to ensure international comparability of MF indicators
- Disaggregation by sectors and by materials to meet the needs from other users than national policy makers
- Quantification of hidden flows (system boundary, data availability)
- Linking MF information with specific environmental problems (impact, damage-based quantification)
- Better understanding of upstream (e.g. mining) and downstream (e.g. waste management) flows and their environmental impacts
- Compilation of internationally comparable/common database