



OECD PROGRAMME ON MATERIAL FLOWS AND RESOURCE PRODUCTIVITY **LG/11/10b**

GUIDANCE MANUAL

Volume II

**A Theoretical Framework for Material Flow
Accounts and their applications at the
national level**

London Group on Environmental Economic Accounting

26-30 March 2007

Johannesburg, South Africa

Context

OECD work on Material Flows and Resource Productivity

Mandate and purpose

- **Implementing the OECD Council Recommendation (April 2004)**
- **Responding to requests by G8 Heads of State and Government (Evian, June 2003; Sea Island, June 2004; 3R initiative, Japan)**
- **Supporting OECD policy analysis and evaluation**

Foundations

- **OECD Seminar in 2000**
- **Member countries initiatives**
- **International work: Eurostat guide; SEEA; research work**

Context

OECD work on Material Flows and Resource Productivity

Co-operation and co-ordination

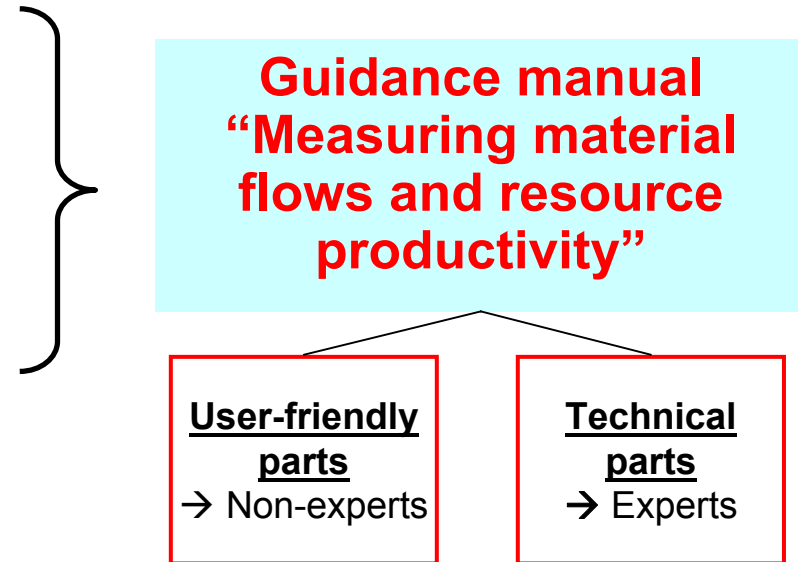
- **Within OECD**
 - Environment Directorate
 - Horizontal programme on Sustainable Development
 - Statistics Directorate (accounting frameworks for SD statistics)
 - Science, Technology & Industry Directorate (I-O analysis & globalisation, sustainable manufacturing)
- **European Union:** Eurostat and TF-MFA, EEA, DG ENV
- **United Nations:** **UNSD and UNCEEA**; UNEP
- **Other:** **London Group**; IWG Environment Statistics; Wuppertal Institut, IFF Vienna, CUEC, WRI

Context

OECD work on Material Flows and Resource Productivity

Main outputs

- 1- Brochure on MFA
- 2- Guidance on methodological and measurement issues
- 3- Guidance on the interpretation and use of MF and RP indicators
- 4- Measured indicators – pilot data set
- 5- Overall report on MF in OECD countries and beyond



Guidance manual

“Measuring material flows and resource productivity”

Structure

- **Volume I: Material flows and resource productivity**
 - overall framework for material flow analysis (MFA),
 - description of different kinds of measurement tools, including accounts and indicators, articulated according to their purposes and uses,
 - discussion of those issues and policy areas to which MFA and material flow indicators can best contribute, and
 - guidance on how to interpret material flow indicators.
- **Volume II: A Theoretical Framework for Material Flow Accounts and their applications at the national level**
- **Volume III: Developing MF accounts – implementation guide**
 - Modular structure: menu of options based on decision tree including simplified, didactic part
 - To promote harmonised implementation
 - To be applied by countries according to own needs & context

Volume II: A Theoretical Framework for Material Flow Accounts and their applications at the national level

Evolution

- **Initial programme centred on EW-MF**
 - First draft based on EW-MFAcc + breakdown of DMI & utilisation of NAMEAs and PIOTs for Indirect flows calculation
 - link to SEEA chapter 3
- **Workshops and other OECD events – in particular Berlin, May 2005 and Rome, May 2006**
 - Experts' and countries' requests of
 - Broadening the scope from EW-MFAcc to other MFAcc
 - Ensuring maximum coherence with the SEEA and SNA
- **UNCEEA meetings, in particular New York, June 2006**
 - Presentation of a paper on the OECD MF&RP work programme and the SEEA – open issues
 - Formal request by the UNCEEA & UNSD of enhancing coherence with the SNA and broader scope, as to contribute to SEEA's revision
- **Formulation of proposals aimed at complying with these requests**
 - Electronic Discussion Group consultation
- **Eurostat Task Force on Material Flow Accounting**
 - Meeting of 4 December 2006

⇒ **Revised broader draft, based on all these inputs**

Volume II: A Theoretical Framework...

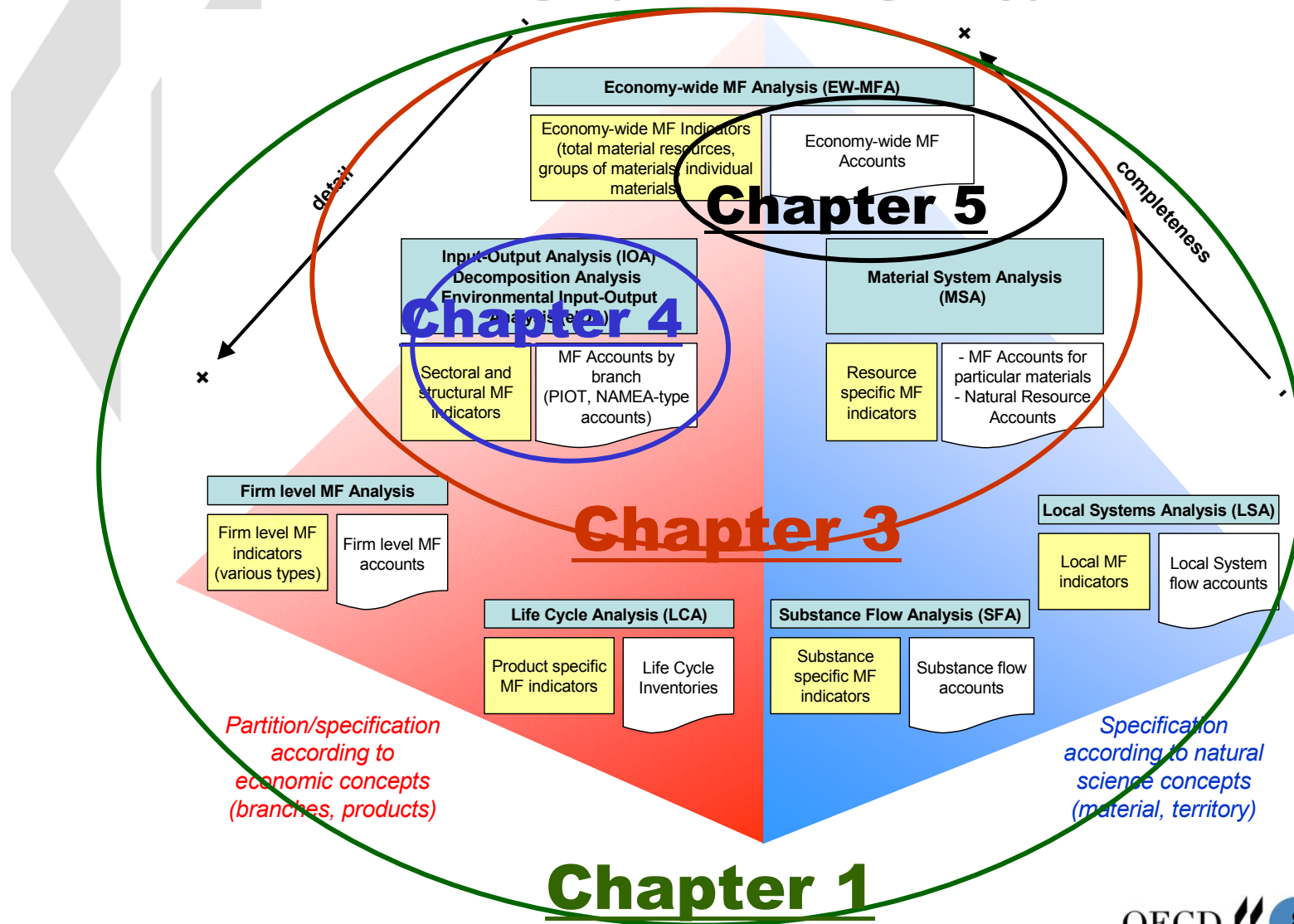
Structure

Introduction

- General conceptual & methodological framework
- Characteristics of National Material Flow Accounts (NMFAcc)
- A complete and exhaustive framework for NMFAcc
- Breakdown by activity of the inputs and outputs of the National socio-economic system and the calculation of its indirect flows
- Economy-wide Material flow accounting (EW-MFAcc) framework for national systems

Volume II: A Theoretical Framework...

Coverage (accounting only)



Volume II: A Theoretical Framework...

Contents

Introduction

Clarifies aims, structure and main characteristics of this Volume of the guidance manual. These are

- **Theoretical and technical** nature
- **Didactical intent**
- **No aim to guide** practitioners in the **implementation** of any particular MFAcc scheme (purpose of Volume III).
- The **issue of coherence with the System of National Accounts** is dealt with in relation to the individual tools (it cannot be dealt with respect to MFA as a whole)

Volume II: A Theoretical Framework...

Contents

1. General conceptual & methodological framework

- Generally valid framework
- Applicable to whatever System / Material / Aggregation level
- General abstract concepts, to be made operational according to the context (i.e. focus system):
 - Material
 - Activity
 - Transformation & Accumulation
 - System boundary
 - Flow
 - Internal/External/Cross boundary
 - Input/Output
 - Used/Unused
 - Direct/Indirect
- General Supply/Use scheme
- Discussion of the measure of total flows, getting higher as the systems are looked at in greater detail
- Generalised notions of gross/net flows

Contents

2. Characteristics of National Material Flow Accounts

- Comprehensiveness, integration between levels, **coherence with national accounts**

“The limits of the available information oblige in certain cases to depart from full coherence with the SNA. This is the case in particular of the Economy-wide Material Flow Accounts described in chapter 5 of the manual. Even in this case, however, the basic structure of the system guarantees a high degree of comparability of MFA data with monetary aggregates.”

Volume II: A Theoretical Framework...

Contents

3. A complete and exhaustive framework for NMFAcc

- **SEEA-based** framework for the application of chapter 1's concepts to national systems
- Describes MFAcc that are **fully coherent with the SNA**
- The socio-economic system is **broken down gradually**, introducing concepts and conventions in relation to the breakdown level when they are first needed (didactical intent)
 - **Starts with black/box worldwide socio-economic system**
 - **Develops it **intersecting** the two basic dimensions**
 - a. Physical (transformation / accumulation)
 - b. Economic (production / consumption / capital formation)
 - **Further develops it introducing breakdown of production activities**
 - **Finally introduces the rest of the world**
- Develops **example PSU and PIO tables** progressively (didactical intent)

Contents

4. Breakdown by activity of the inputs and outputs of the National socio-economic system and the calculation of its indirect flows (based mainly on K. Schoer's input)

- Emphasises the importance of MF information on the (cross-boundary) flows of the socio/economic system broken down by kind of economic activity
- Illustrates hybrid or NAMEA-type MFAcc, which can be considered a partial realisation of chapter 3's accounting scheme, and
- Discusses indirect flows and the approaches to their calculation, focussing in particular on IO approaches, taking also into account the compilation costs of the different kinds of tables

Volume II: A Theoretical Framework...

Contents

5. Economy-wide MFAcc framework for national systems (based mainly on Eurostat's methodological guide)

- Eurostat-guide-based scheme
- Pragmatic specification of chapter 3's scheme for **quasi-black-box** type National MFAcc (only physical distinction inside the socio/economic system)
- Uses databases highly **detailed by material** for the construction of highly **aggregated** accounts/indicators
- **DEVIATES PARTIALLY FROM SNA:**
 - Renounces to coherence with SNA and to details to gain in **feasibility**, communication power, holistic meaningfulness
- Relations between SNA-coherent and EW MFAcc are discussed and graphically and numerically shown (**reconciliation tables**, to be developed)

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Contents' highlights – chapter 1

Two different types of material balances are distinguished, concerning respectively:

- a. the **exchange** of **individual materials** (or material's groups) (e.g. a **market**)
- b. the **transformation** of materials that are refined, combined, mixed, burnt...

The Material Balance principle equally applies to both. However:

- a. the materials appearing on one side of the balance (**supplied quantities**) are *physically identical* to those appearing on the other side (**used quantities**)
⇒ **PSUTs read by row couples**
- b. the materials appearing on one side of the balance (**inputs**) are *physically different* from the materials that appear on the other side (**outputs**)
⇒ **PSUTs read by column couples, PIOTs**

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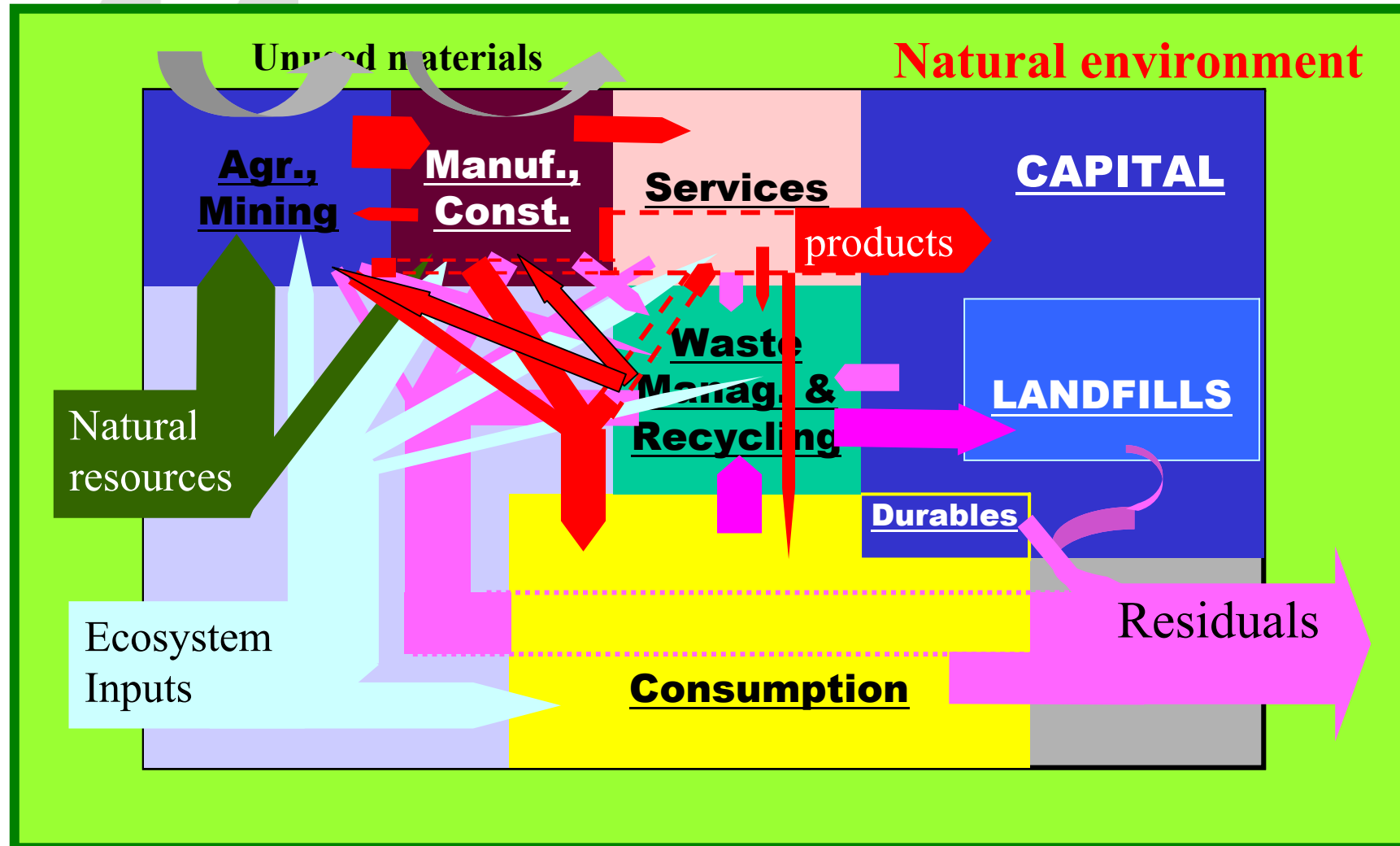
Contents' highlights – chapter 3 – approach

Didactic intent:

1. **Simplification: national socioeconomic system having material exchanges with nature only**
 - gradual subdivision (next slide)
 - example tables at all stages of subdivision
2. **Full-fledged scheme, including rest of the world**
 - **Activities of residents abroad and of non-residents internally are not dealt with, though could be easily introduced**
 - **Also flows of waste are considered**

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Contents' highlights – chapter 3 - progression



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Contents' highlights – chapter 3 – Example tables

- Imaginary country, always the same, getting gradually more detailed
- Material and activity “classifications” adapted to the OECD programme’s needs
- Emphasis on the description of matter circulation: wide use of example PIOTs besides PSUTs
- Two types of example PIOTs:
 - Describing all flows of each individual type of materials
 - Link to NAMEA
 - Describing the whole transformation chain of specific natural resources or kinds of materials
 - Link to the description of life cycle of specific materials and substances, or even products.

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Contents' highlights – chapter 4 (1/2)

The departure of EW-MFAcc from **perfect** coherence with the SNA is explained in comparison with section 4's NMAFcc framework

Besides the aggregation level **by activity**, the differences are in the system boundary:

- a. Between socio-economic system and natural system:
treatment of biomass cultivation/harvest (see next slide)
- b. Between the national system and the rest of the world:
compliance with residence principle not strictly necessary

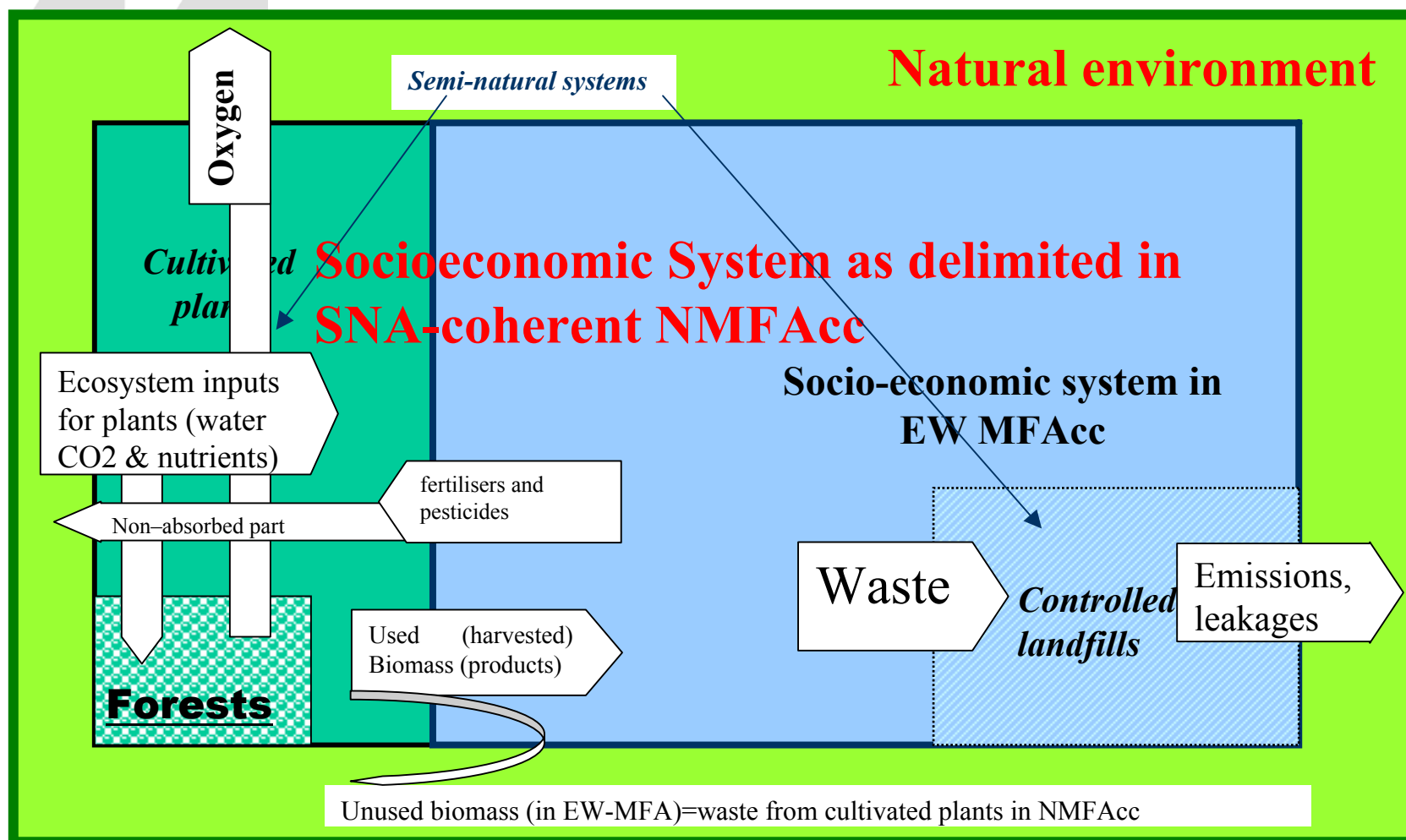
Our aim is to **make differences clear**, to highlight their *raison d'être*, discuss their impact on aggregate measures and show how they can be reconciliated

⇒ No need to “impose” 100% coherence

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Contents' highlights – chapter 4 (2/2)

Main difference between SNA-coherent NMFacc and EW-MFacc





THANK YOU FOR THE ATTENTION

“Onore al piccone e ai suoi più moderni equivalenti: essi sono tuttora i più importanti intermediari nel millenario dialogo fra gli elementi e l’uomo”

Primo Levi
Il sistema periodico, Carbonio