Ecosystem Accounting
Introduction to key Concepts
"Level 0" Training

Project: Advancing the SEEA
Experimental Ecosystem Accounting

United Nations   UNEP   Convention on Biological Diversity   NORWEGIAN MINISTRY OF FOREIGN AFFAIRS

SEEA-EEA Training

- Accounts and Tools

- Flexible and modular (don't need all Accounts and Tools)

- Three levels:
  - Level 0 (All participants)
  - Level 1 (Compiling)
  - Level 2 (Providing data, country examples)

- Links to related training materials:
  - Secretariat for the Convention on Biological Diversity (SCBD)
    - Quick Start Package (QSP): includes GIS exercises
  - World Bank WAVES

Exercise

Discussion

- Prepare for group exercise…think about:
  - **What** are your priority accounts?
  - **Why** those accounts?
  - Opportunities to produce them?
    - Stakeholders?
    - Institutional mechanisms?
    - Current activities?
  - Constraints?
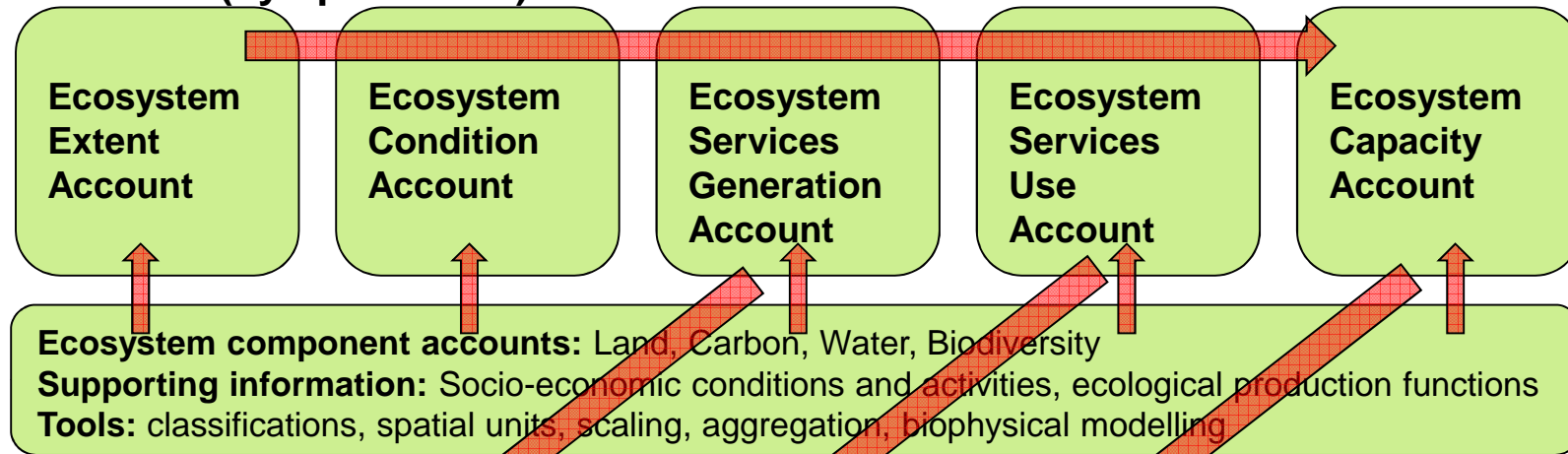   - Data?
    - Capacity?

Key Concepts - Level 0

- **Learning objectives**
  - Understand the basic concepts of SEEA-EEA accounts and tools
    - **What** is it?
    - **Why** do we need it?

- **Level 0 – Training**
    - **What** does it look like?
    - **Expertise** & **data** required
    - **Links** to related training materials
  - For technical & scientific experts, this is:
    - Preparation for Level 1 (Compiling)
  - For policy experts and supporters you will:
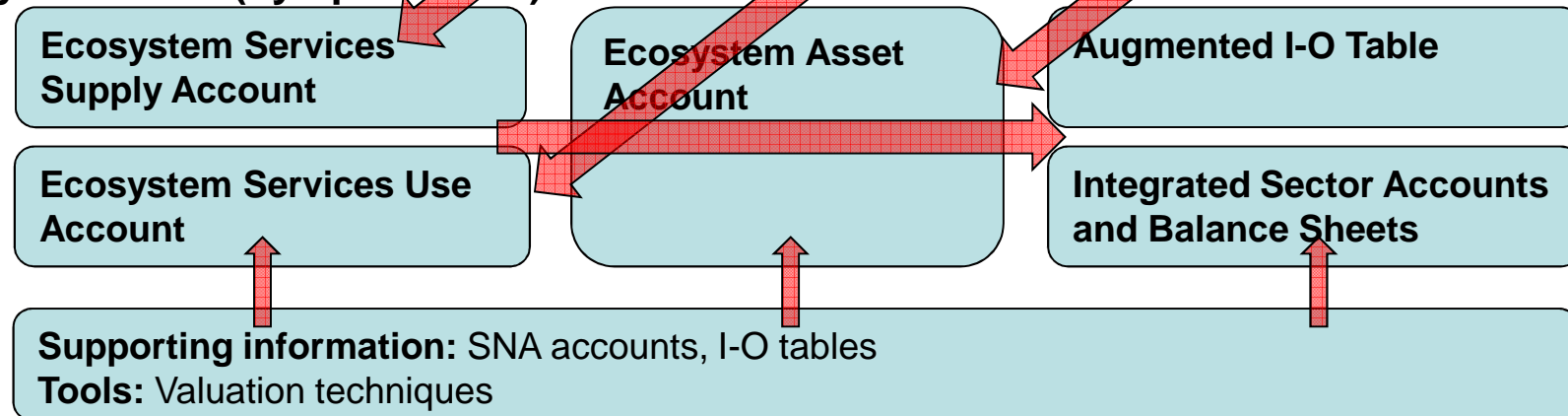   - Understand how to use and who to engage in the discussion

SEEA-EEA accounts and linkages

Physical Accounts (by spatial unit)

Ecosystem Extent Account	Ecosystem Condition Account	Ecosystem Services Generation Account	Ecosystem Services Use Account	Ecosystem Capacity Account

Ecosystem component accounts: Land, Carbon, Water, Biodiversity
Supporting information: Socio-economic conditions and activities, ecological production functions
Tools: classifications, spatial units, scaling, aggregation, biophysical modelling

Monetary Accounts (by spatial unit)

Ecosystem Services Supply Account	Ecosystem Asset Account	Augmented I-O Table
Ecosystem Services Use Account		Integrated Sector Accounts and Balance Sheets

Supporting information: SNA accounts, I-O tables
Tools: Valuation techniques

5

Part 2: SEEA-EEA Training (Level 0)

Today's session presents 2-4 slides on each topic:

Accounts
- Ecosystem Extent Account
- Ecosystem Condition Account
- Socio-economic information
- Water Account
- Carbon Account
- Biodiversity Account
- Ecosystem Services Generation Account
- Ecosystem Services Use Account
- Ecosystem Capacity Account
- Augmented I-O tables
- Integrated Ecosystem Institutional Sector Accounts and Balance Sheet

Tools*
- Classifications
- Spatial units, scaling and aggregation
- Biophysical modelling
- Valuation

Account 1: Extent
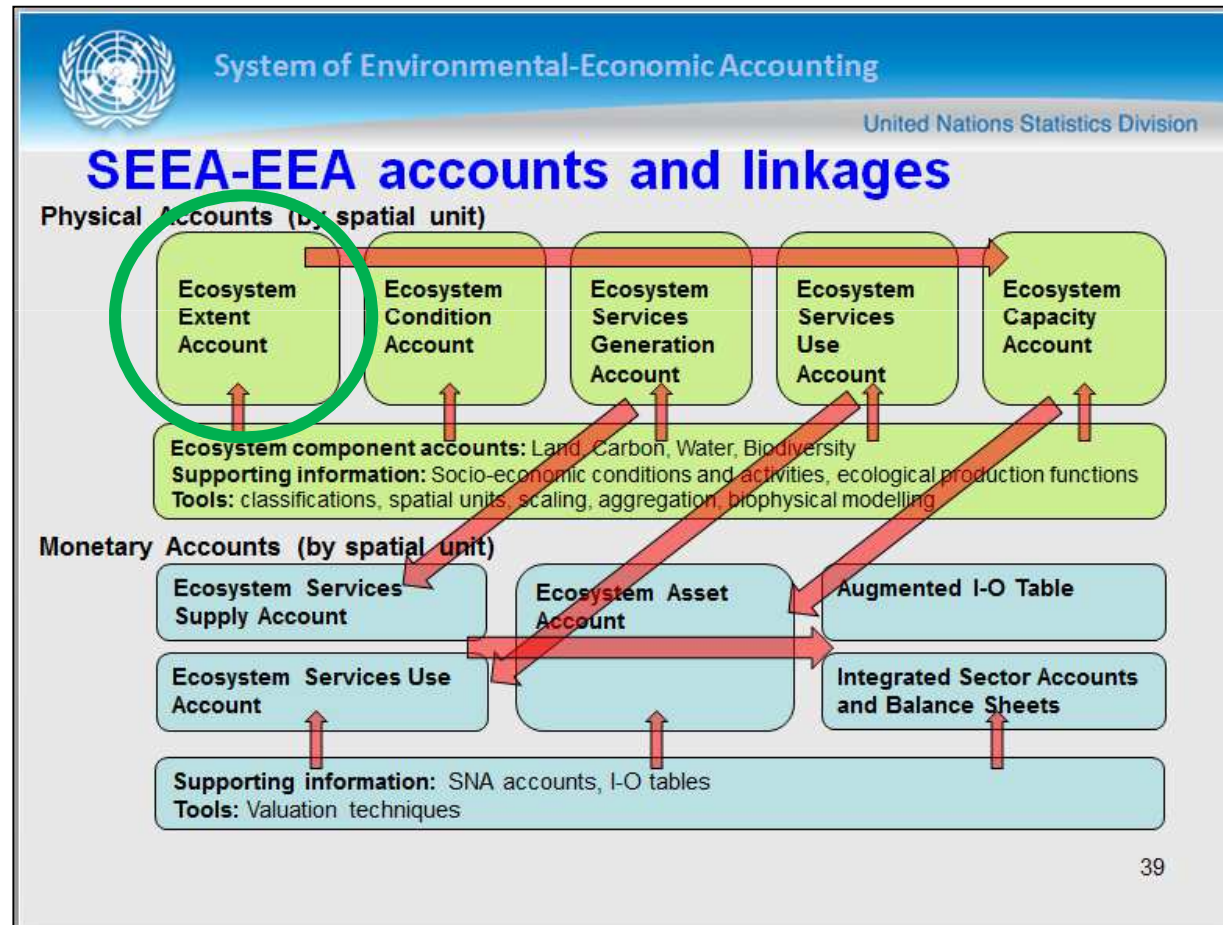
Level 0: Account 1: Extent

- ## What?
  - *Ecosystem assets* are spatial areas containing a combination of biotic and abiotic components and other characteristics that function together (SEEA-EEA Sections 2.31, 4.1)
  - **National** coverage of land cover, land use, ownership (terrestrial, freshwater, coastal and marine areas)
- ## Why?
  - Land management, conservation policies
  - Spatial foundation for other accounts
    → basis for allocating macro data to spatial units
  - Builds on SEEA-CF (land, forest, water)
  - Indicators:
    - Land cover change → where changes occurring
    - Land cover/use intensity → who owns it

Account 2: Condition
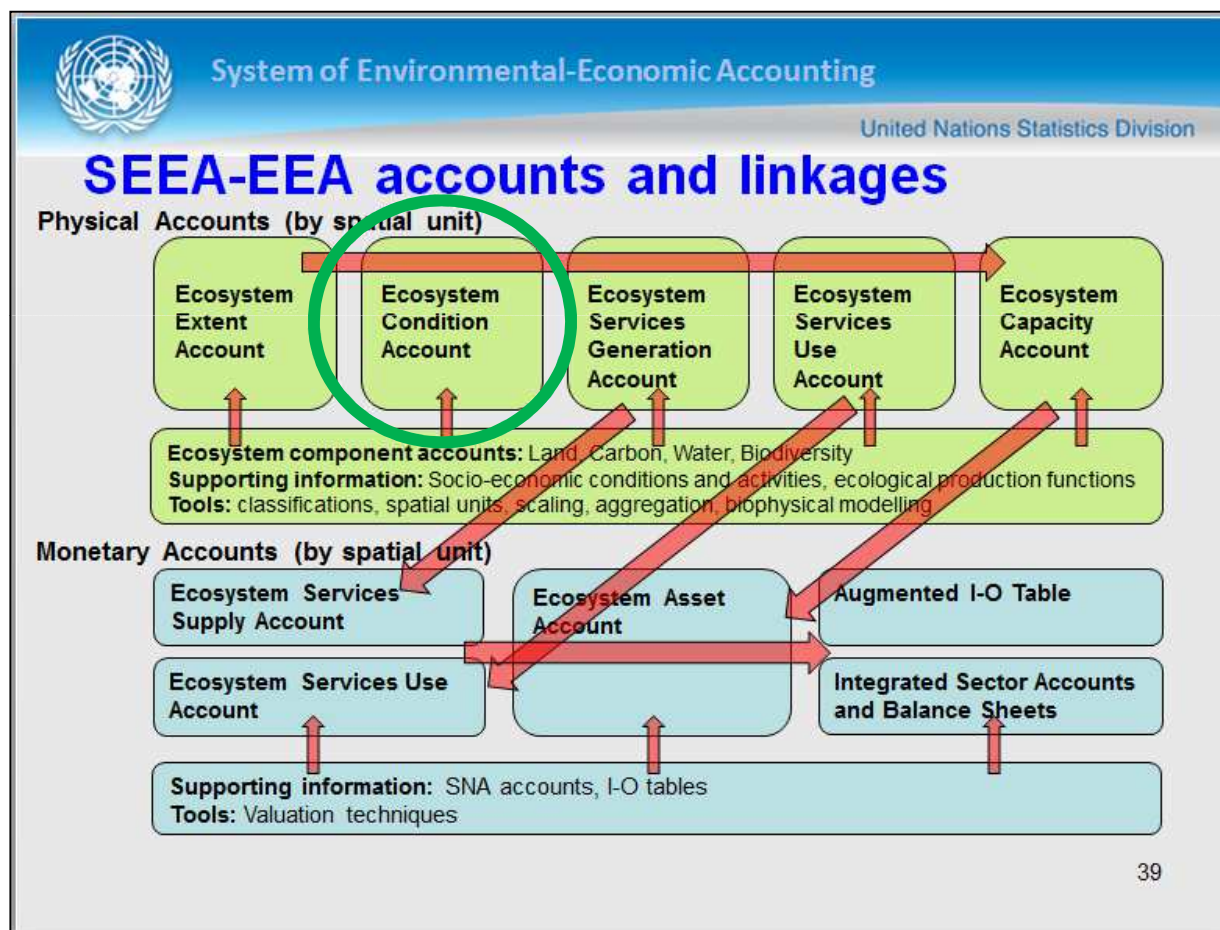
Level 0: Account 2: Condition

- ## What?

  - ***Ecosystem condition*** *reflects the overall quality of an ecosystem asset, in terms of its characteristics.* (SEEA EEA paragraph 2.34)

- ## Why?

  - Policies to limit degradation of natural heritage, rehabilitation of degraded ecosystems

  - Links to capacity to produce services (Production account)

  - Indicators:

    - Indices of condition ➜ change over time ➜ where changes

    - Good/bad condition (exceeding "safe" levels) ➜ where

Account 3: Water
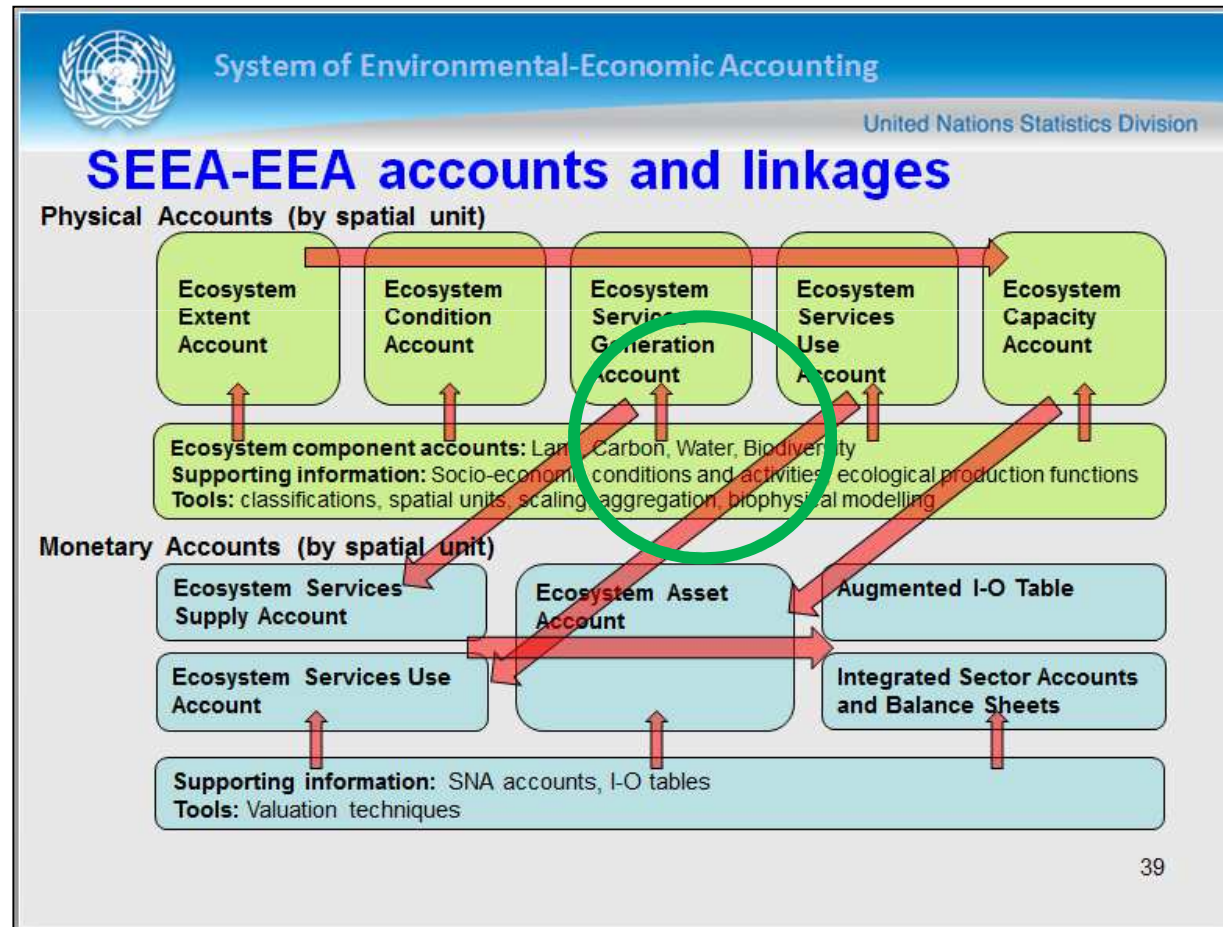
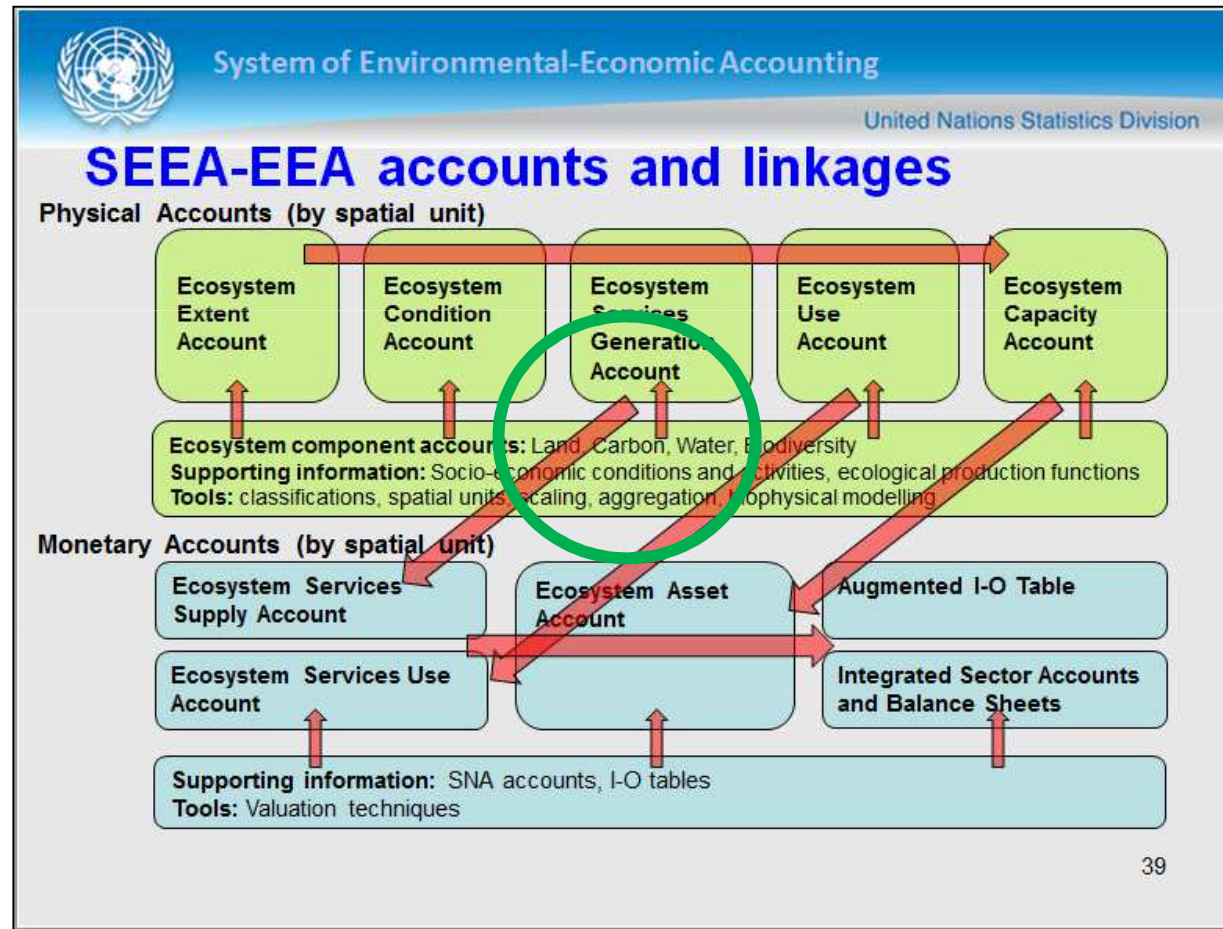# Level 0: Account 3: Water

- ## What?
  - Spatially-detailed version of SEEA-CF water account to capture:
    - Inter-ecosystem flows of water (4.62),
    - Water quality and
    - Supply/use for ecosystems

- ## Why?
  - Policies on water security, water quality, impacts of water abstraction on ecosystems
  - Links to other accounts (Condition, Ecosystem Services Generation)
  - Links to SEEA-CF; SEEA-WATER
  - Indicators:
    - Local water supply/use, quality (use > supply?)
    - Variability in supply, trends (draughts, floods)

12

Account 4: Carbon


13

Level 0: Account 4: Carbon

- ## What?
  - Accounting for **biocarbon** as an asset (e.g., soil carbon)
  - Carbon-related services (sequestration and storage)
  - Carbon as a characteristic of ecosystem condition (productivity)
- ## Why?
  - Policies on climate change, low-carbon economy
  - Assess changes in land cover and land use on carbon stocks and sequestration
  - Links to other SEEA accounts (Condition, materials, Production)
  - Links to SEEA-CF (timber and soil)
  - Links to international guidelines (IPCC and REDD+)
  - Indicators:
    - Natural and human additions to carbon stock → where
    - Natural and human removals from carbon stock → where

Account 5: Biodiversity
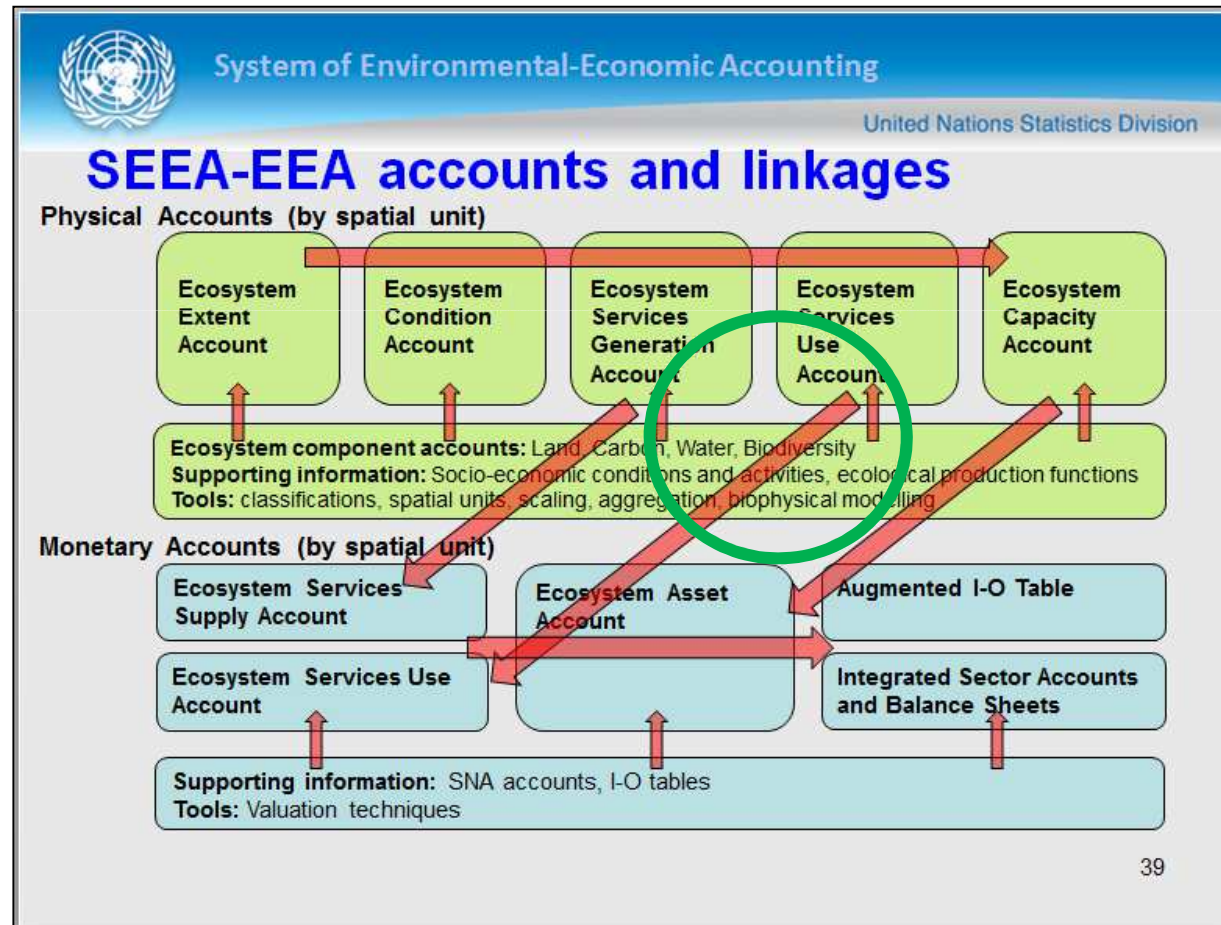
Level 0: Account 5: Biodiversity

- ## What?
  - Spatially-detailed statistics on
    - Selected species (abundance, classification, diversity and status)
    - Selected and related habitats (link to extent account)
- ## Why?
  - Biodiversity and ecosystem policies (natural heritage, conservation); Aichi Target 2; Red-list Species
  - Links to other SEEA accounts (Condition, Ecosystem Services Generation)
  - Indicators:
    - Species populations ➔ changes over time
    - Protected habitats ➔ changes over time
    - Indices of species diversity ➔ Condition Account

16

Account 6: Services Generation

17
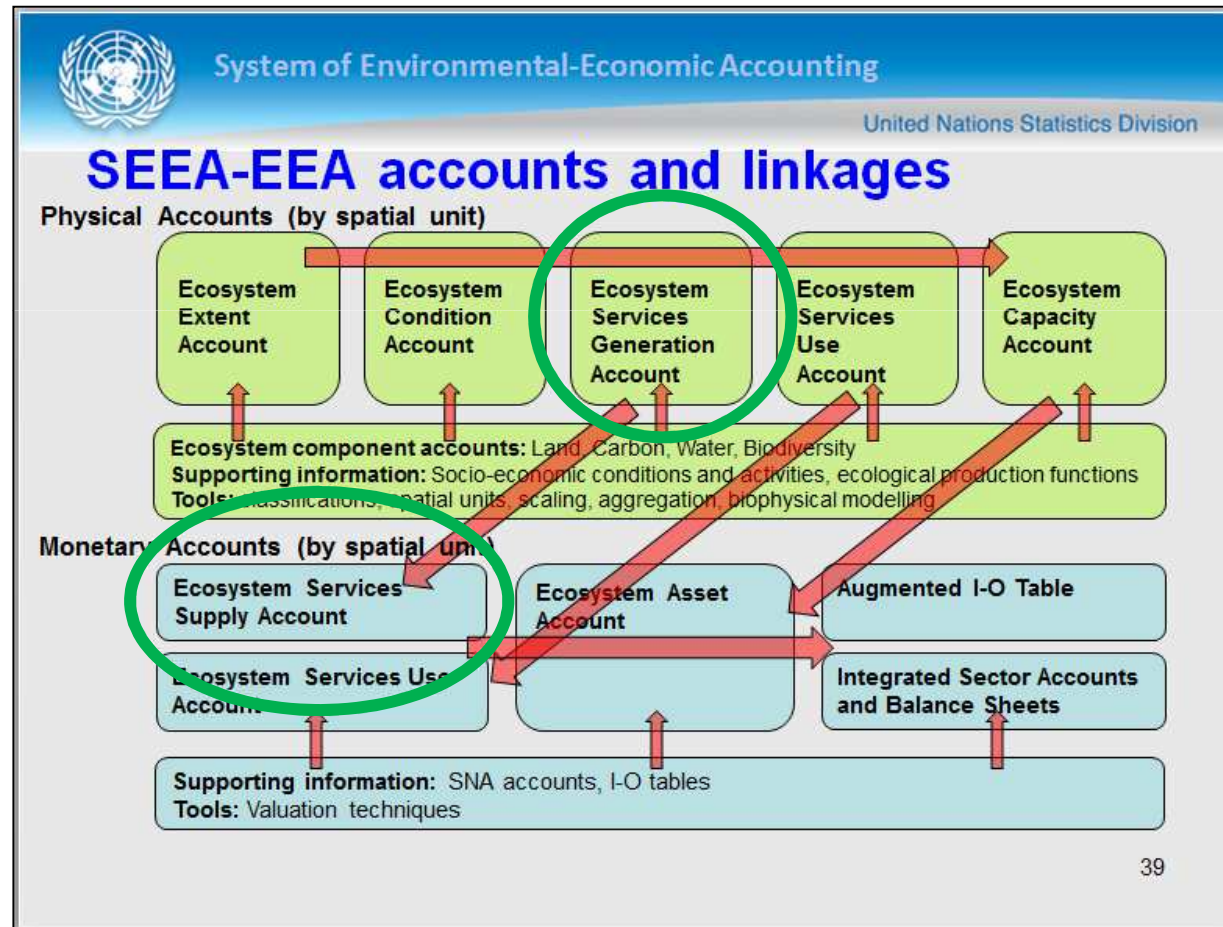
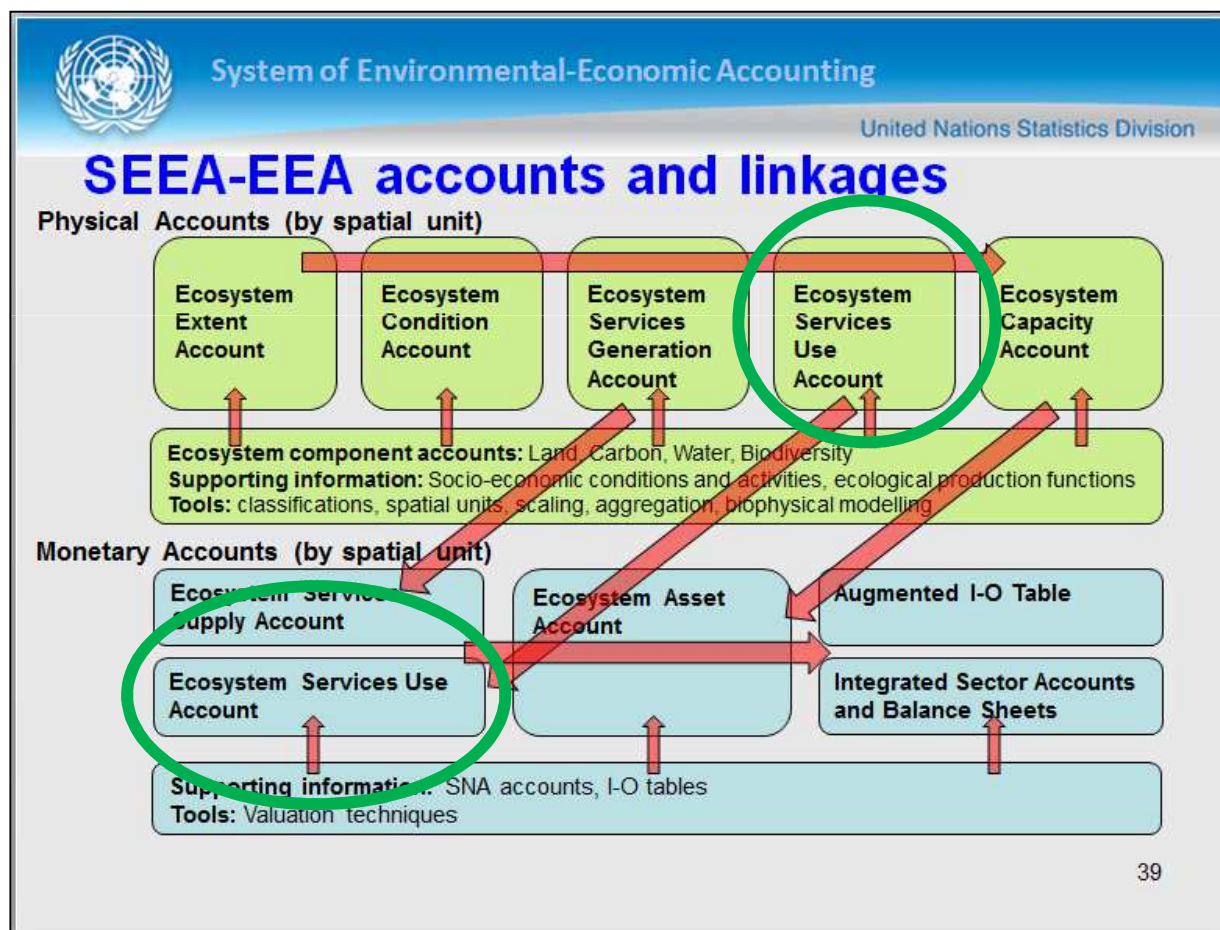# Level 0: Account 6: Services Generation

- ## What?
    - Physical and monetary flows of "final" ecosystem **services** from ecosystems to beneficiaries
    - Directly used by (or affect) people

- ## Why?
    - Inform policies of contribution of ecosystems to human well-being
    - Assess trade-offs between development and conservation
    - Link to standard economic production measures in SNA
    - Link to other SEEA-EEA accounts (Condition, Supply and Use) and tools (Valuation)
    - Indicators:
        - Flows of individual services (physical and monetary) ➜ change
        - Indices of aggregated services by ecosystem type ➜ change

Account 7: Services Use

Level 0: Account 7: Services Use

- ## What?
  - Physical and monetary flows from ecosystems to **beneficiaries**

- ## Why?
  - Social, economic and environmental policies:
    - Who benefits from ecosystem services?
    - Who is dependent on ecosystem services?
  - Link to consumption accounts in SNA
  - Link to other SEEA-EEA accounts (Ecosystem Services Generation)
  - Indicators:
    - Dependence on ecosystem services → where and whom
    - Public goods from private ecosystems

20
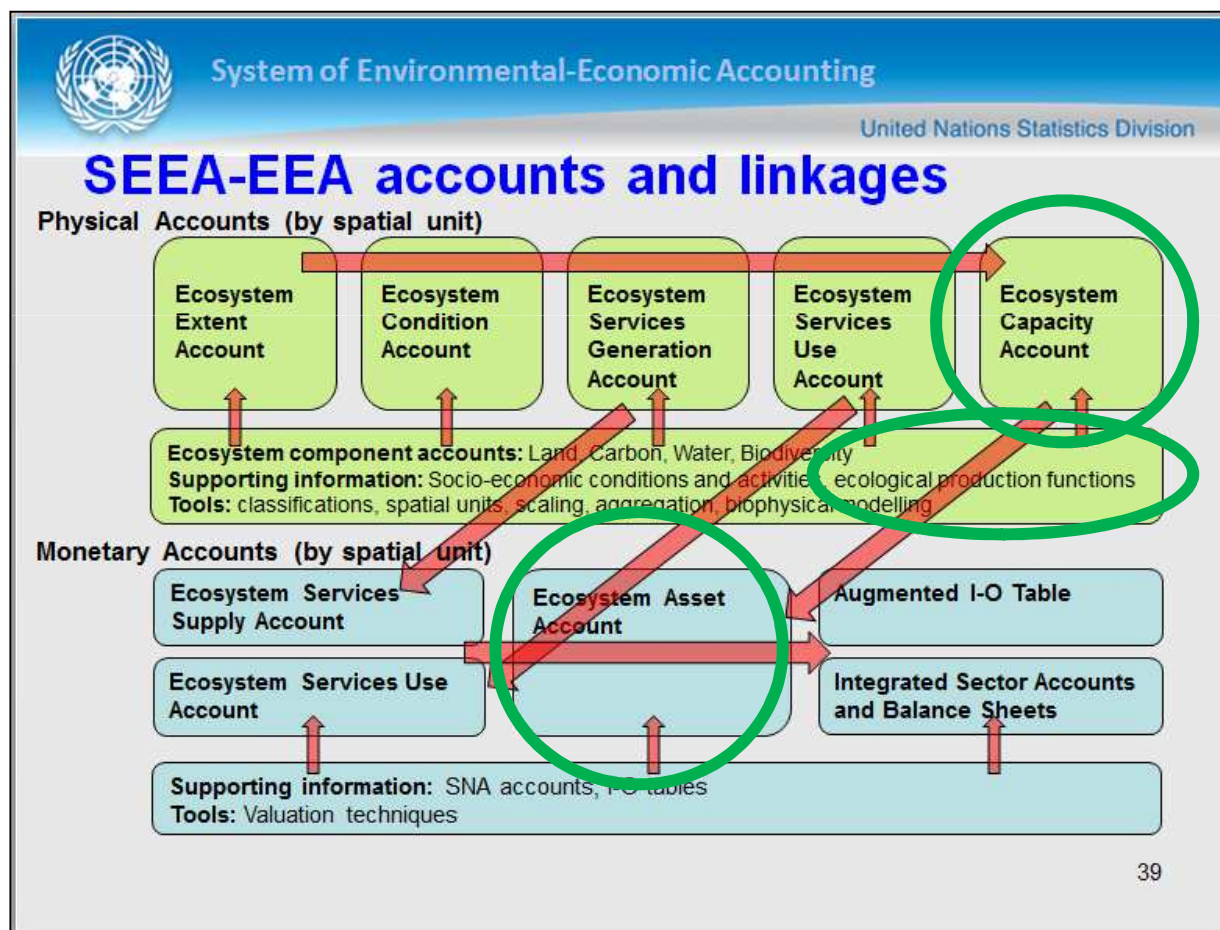
Account 8: Capacity

Level 0: Account 8: Capacity

- ## What?
  - **Expected** flows of services
  - Modeled using **Ecosystem Condition Account**
 - Current and future capacity to generate services
- ## Why?
  - Policies related to changing land use, land use intensity, environmental quality, population distribution
  - Ecosystem assessments: Trade-off scenarios of services for different future conditions
  - Estimate **Services Generation** if little data available

  ## Indicators:
  - Calculate **Ecosystem Asset Account**
    - "Value" is Net Present Value of future flows of services

Account 9: Augmented I-O
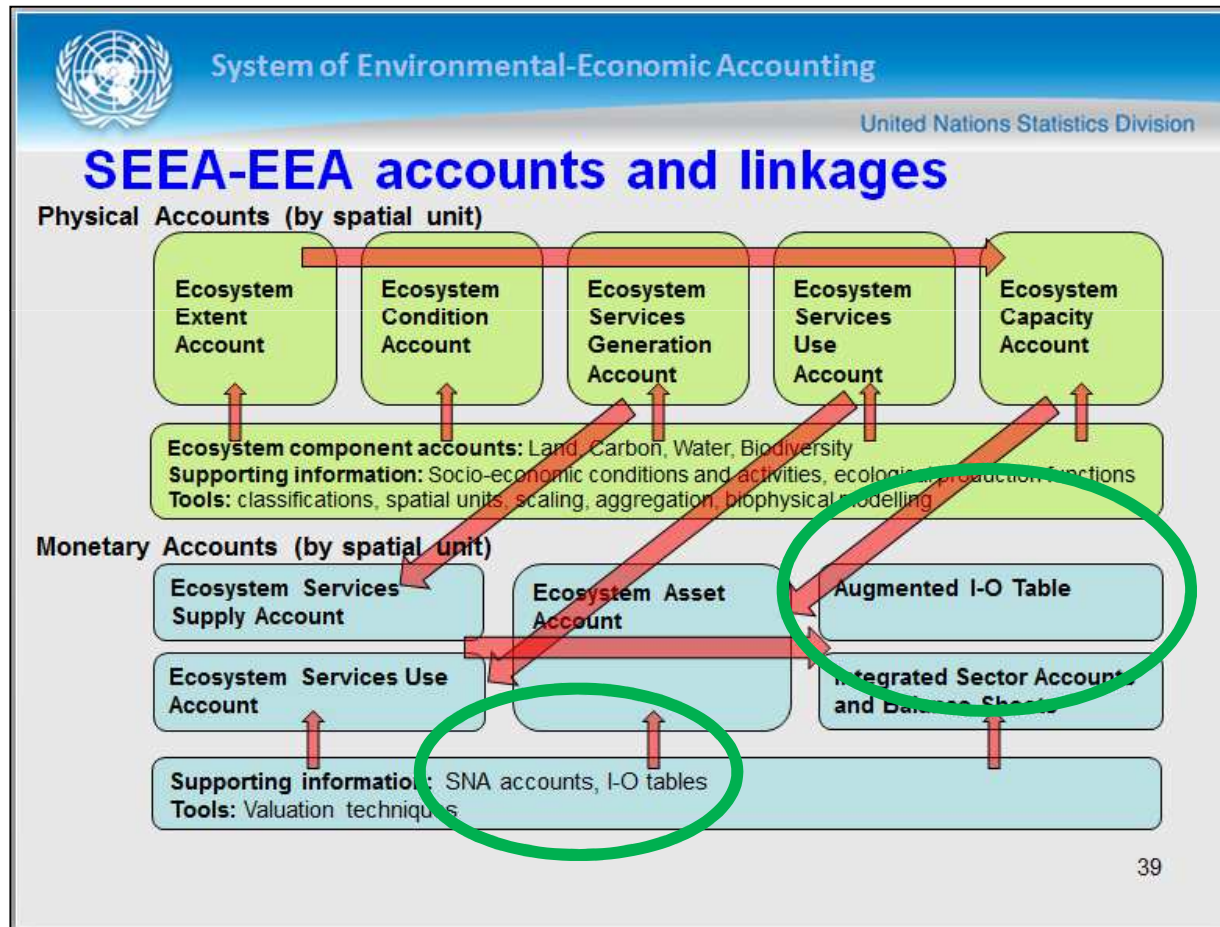
Level 0: Account 9: Augmented I-O

- **What?**
  - Augmentation of standard Input-Output tables to take into account ecosystems (producers) and ecosystem services (commodities)
- **Why?**
  - Show contribution of ecosystems and services to the economy (direct and indirect)
  - Support decisions about the economic impacts of ecosystem change
  - Link to SNA
  - Use I-O methods to balance production and consumption

# Account 10: Integrated Sector Accounts and Balance Sheet
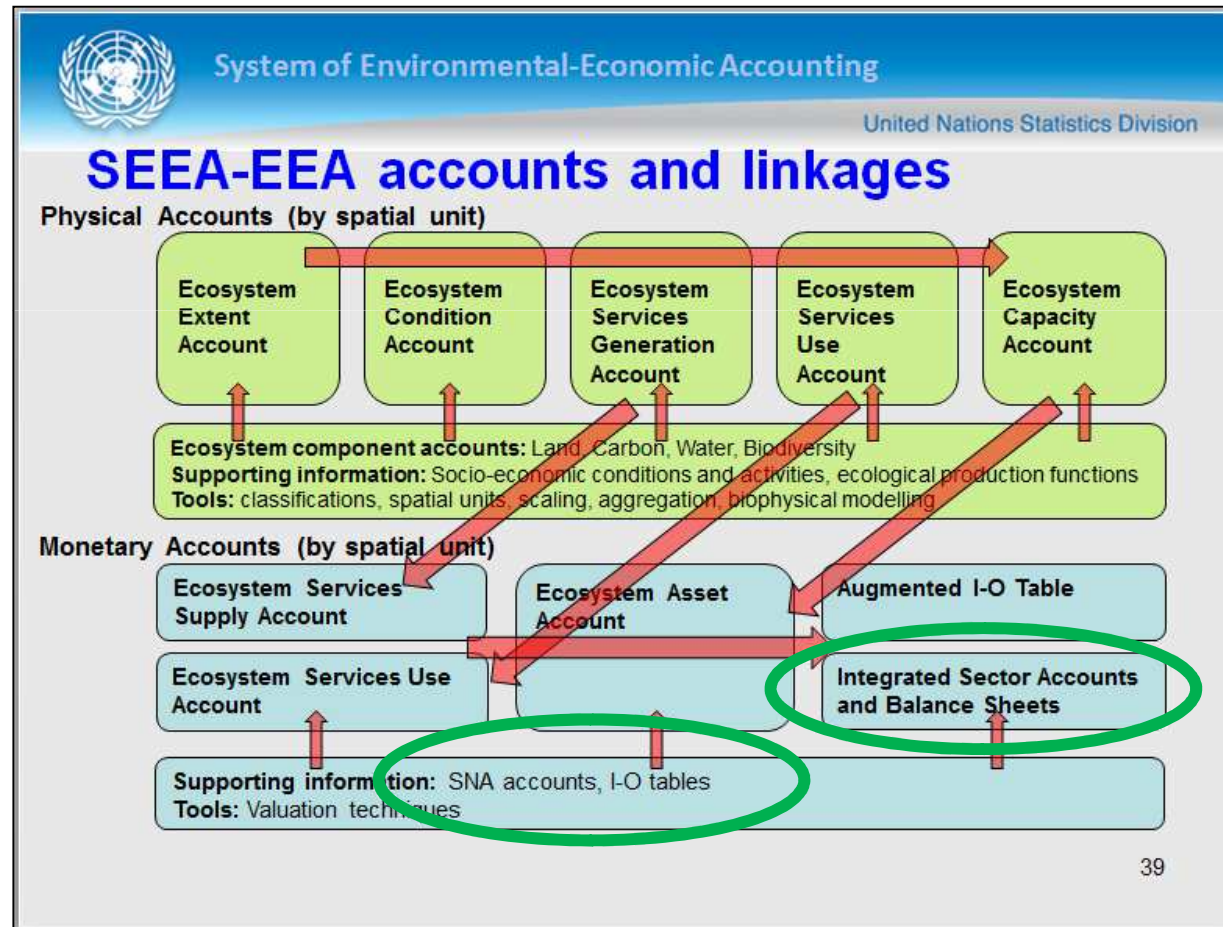
Level 0: Account 10: Integrated Sector Accounts and Balance Sheet

- **What?**
  - Sector level summary accounts
  - Standard aggregates adjusted for degradation
- **Why?**
  - Augment the economic accounts of the SNA by integrating into a sequence of accounts
  - **Integrated Sector Accounts** produce aggregate measures of economic activity, such as national income and saving, which are adjusted for ecosystem degradation.
  - **Balance Sheets** compare the values of ecosystem assets with values of produced assets, financial assets (and liabilities) and other economic assets.

Supporting information: Socio-economic
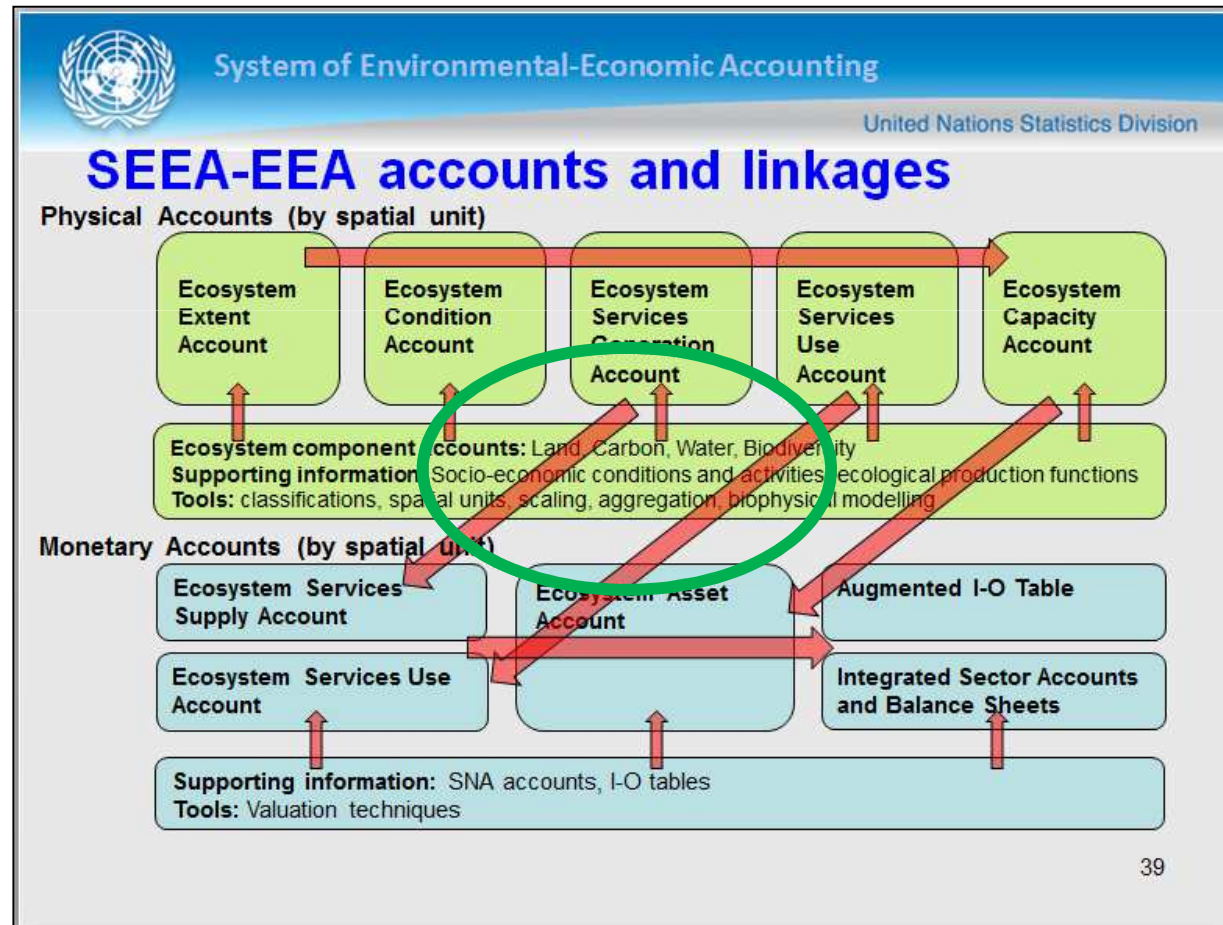
Level 0: Supporting Information: Socio-economic

- ## What?
  - Socio-economic data and other Drivers of change
- ## Why?
  - People, governments and businesses are Drivers of change **and** beneficiaries of Ecosystem Services
  - Understand **why** a change occurred (natural or human?)
  - Support scenarios of future **Capacity Account**
  - Links to SEEA-EEA accounts (**Asset, Condition, Water, Carbon, Biodiversity, Production, Supply-use**)
  - **Indicators:**
    - Allocate changes in assets to local, national and global drivers
    - Allocate generation of services to beneficiaries
    - Estimate dependence of population and business on ecosystems (food security, water security, flood risks)

End of Accounts…

Questions?
Discussion

- Prepare for group exercise…think about:
  - **What** are your priority accounts?
  - **Why** those accounts?
  - Opportunities to produce them?
    - Stakeholders?
    - Institutional mechanisms?
    - Current activities?
  - Constraints?
    - Data?
    - Capacity?

Discussion

- Group discussion, questions and issues

Other related training materials

- Secretariat for the Convention on Biological Diversity (SCBD)
  - Quick Start Package (QSP) (Weber, 2014)
    - Available online at www.ecosystemaccounting.net
    - Includes free GIS software and tutorials
  - National Biodiversity Strategies and Action Plans
    - Training modules at www.cbd.int/nbsap/training/
- World Bank WAVES
- Statistics Canada:
  - Measuring Ecosystem Goods and Services Teacher's Kit

References

- SNA 2008
- SEEA Central Framework, SEEA-EEA, applications
- SCBD Quick Start Package (www.ecosystemaccounting.net)
- World Bank WAVES: Designing Pilots for Ecosystem Accounting
- International Monetary Fund: DQAF
- UN: NQAF
- UNECE: GSBPM

Australian Bureau of Statistics, 2013. Land Account: Queensland, Experimental Estimates, 2013

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Remme, Roy P., Matthias Schröter, and Lars Hein. "Developing spatial biophysical accounting for multiple ecosystem services." Ecosystem Services 10 (2014): 6-18.

Statistics Canada, 2013. Human Activity and the Environment: Measuring Ecosystem Goods and Services 2013. 16-201-XWE. Ottawa: Government of Canada.

Weber, J., 2014. *Ecosystem Natural Capital Accounts: A Quick Start Package*. 77 (Technical Series). Montreal: Secretariat of the Convention on Biological Diversity.

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33