SEEA EXPERIMENTAL ECOSYSTEM ACCOUNTS : BROAD CONCEPTS AND STRUCTURES

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OUTLINE

- Scoping ecosystem accounting
- SEEA Experimental Ecosystem Accounts: context and proposed structure
- Key concepts: ecosystem services and ecosystem capital
- Statistical Units for ecosystem accounting
- Measurement issues for ecosystem services
- Measurement issues for ecosystem capital
- Approaches to valuation and pricing
- Ecosystem accounting in monetary terms

SCOPING ECOSYSTEM ACCOUNTING

- Measurement of state and change in state of ecosystems and flows from ecosystems to individuals and society
- Accounting for multiple ecosystems
- Spatial approach: Key difference from SEEA CF
- Multi-disciplinary approach : ecological science, ecological economics, national accounts and official statistics
- Accounting approach: organises large range of information, includes both physical and monetary data, describes conceptual relationships

SEEA EXPERIMENTAL ECOSYSTEM ACCOUNTS

- Complement to SEEA Central Framework
  - General topic of ecosystems and degradation discussed in SEEA-2003
  - Topic of ecosystem accounting separated through the SEEA revision process
- Links to SEEA Central Framework
  - Physical flows and ecosystem services
  - Asset accounts for individual environmental assets and ecosystem capital
- Links to SNA
  - Valuation principles
  - Sequence of accounts and balance sheets

“EXPERIMENTAL” ACCOUNTS

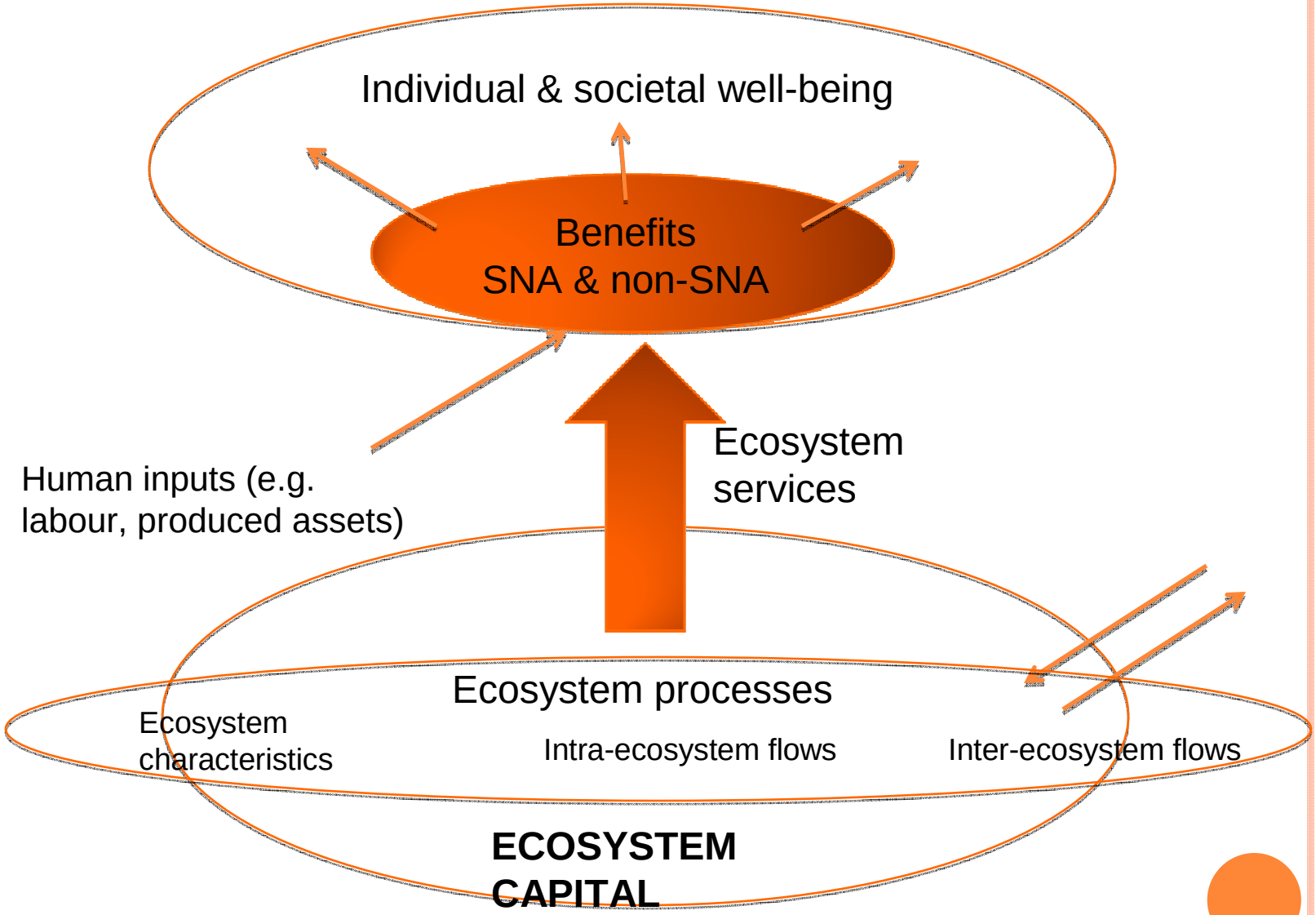
- Underlying concepts from ecology, ecological economics, national accounts and official statistics well established
- Integration is relatively new although ideas for various aspects have existed for many years
- Significant convergence on core measurement objectives and framework
- Experimentation lies in the need for testing of methods and approaches and the need for trials at national scale

CHAPTER OUTLINE

- 1: Introduction
  - Set context and policy relevance, objectives and measurement basis
- 2: Principles of ecosystem accounting
  - Perspective on ecosystems
  - Relationships between stock and flows
  - Statistical units
  - General measurement issues
- 3: Ecosystem services in physical terms
  - Measurement boundaries and classification
  - Accounting structures
  - Measurement approaches

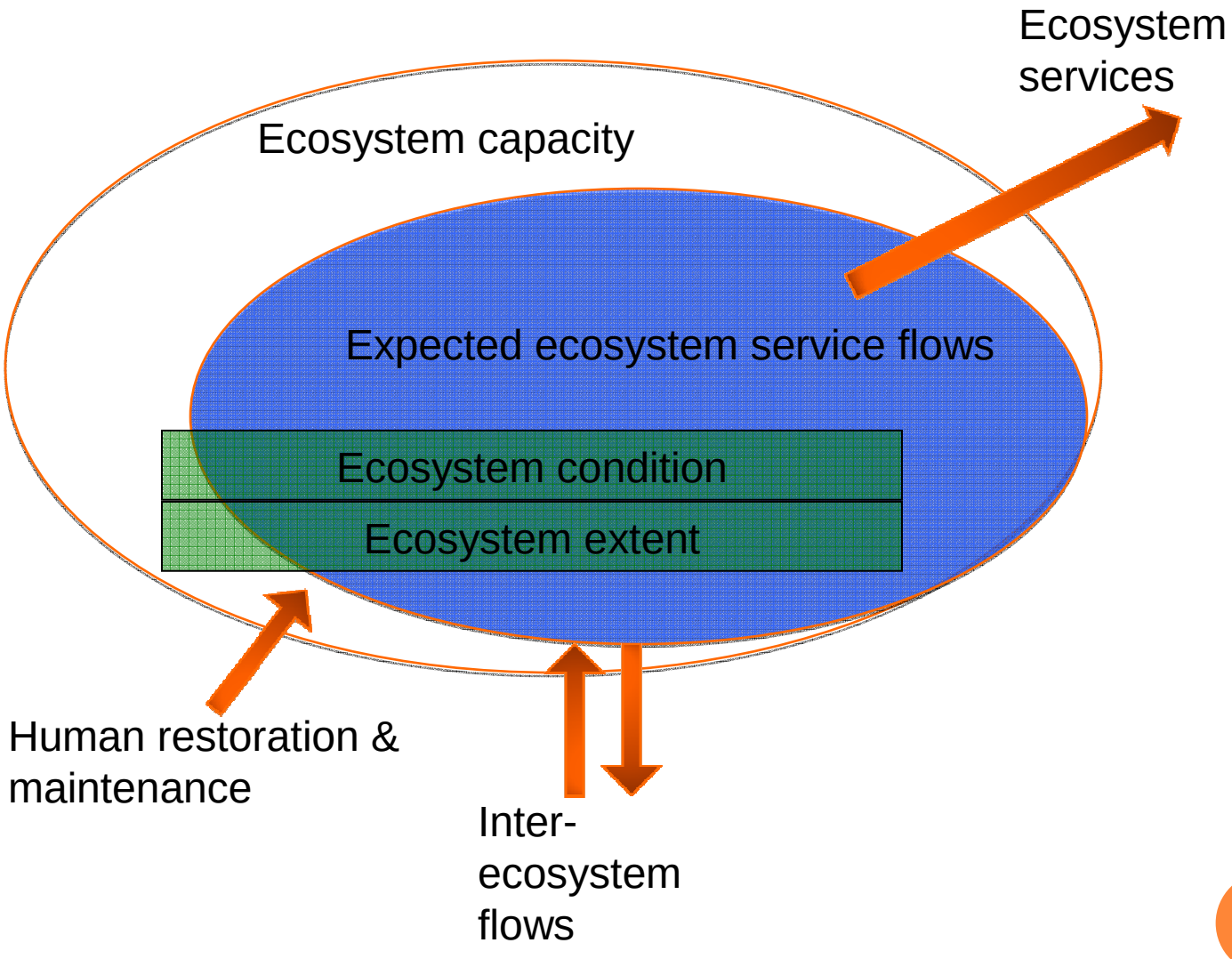
CHAPTER OUTLINE (CONTINUED)

- 4: Accounting for ecosystem capital in physical terms
  - Ecosystem capital model including ecosystem change
  - Measurement approaches
  - Accounting for carbon and biodiversity
- 5: Approaches to valuation
  - Concepts of value
  - Approaches to valuation of ecosystem services
- 6: Accounting for ecosystems in monetary terms
  - Sequence of accounts and wealth accounting
  - Ecosystem degradation and enhancement
  - Related monetary transactions


Individual & societal well-being
Benefits
SNA & non-SNA
Human inputs (e.g.
labour, produced assets)
Ecosystem
services
Ecosystem processes
Ecosystem
characteristics
Intra-ecosystem flows
Inter-ecosystem flows
ECOSYSTEM
CAPITAL

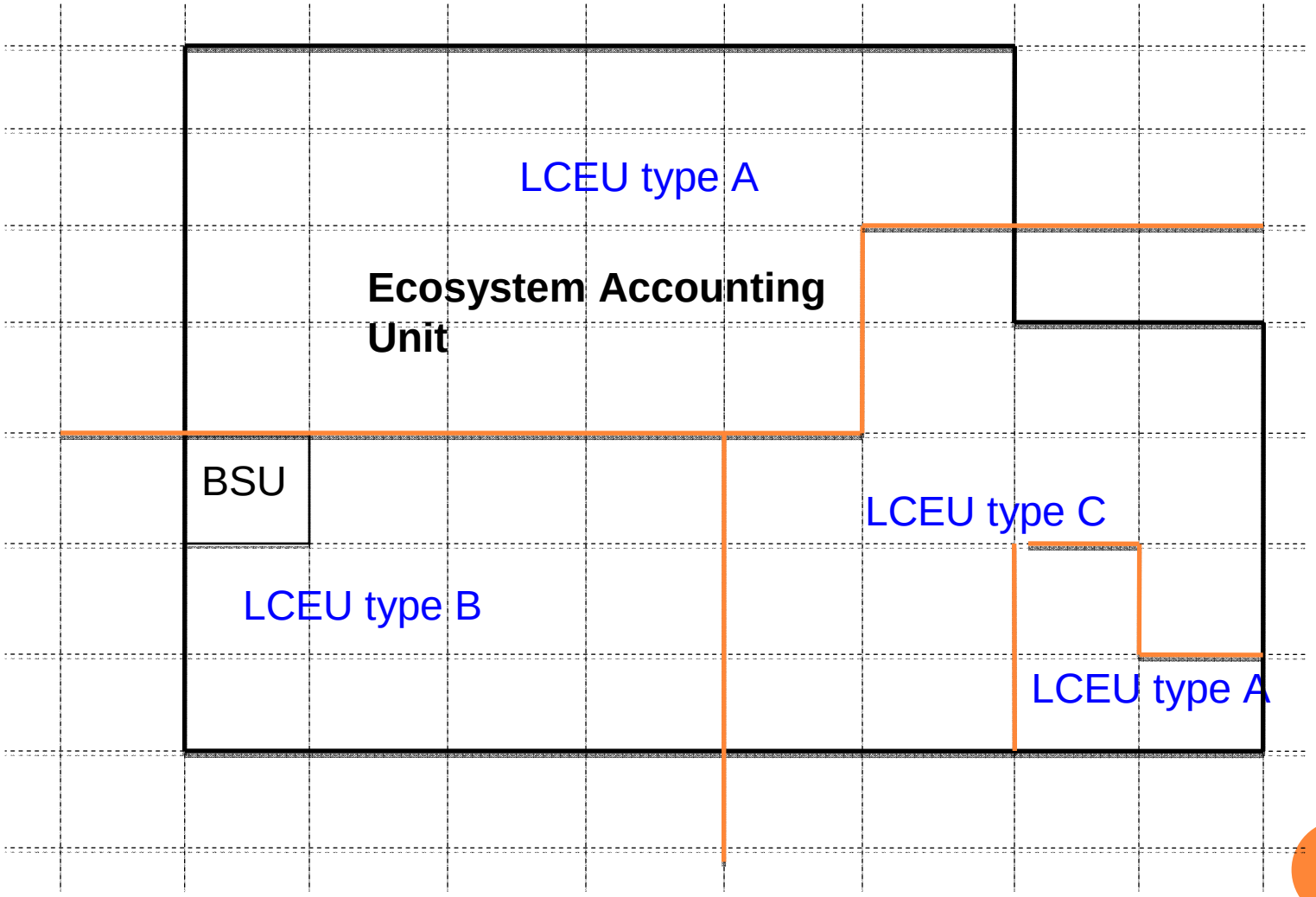
ECOSYSTEM SERVICES : KEY POINTS

- Recognise private and public benefits – i.e. beyond SNA production boundary
- Three types of ecosystem service : provisioning, regulating and cultural
- Only “final” outputs of ecosystem – a “chained” approach
- Significance of assessing trade-offs and dependencies – some services generated in tandem, some are competing


Ecosystem services
Ecosystem capacity
Expected ecosystem service flows
Ecosystem condition
Ecosystem extent
Human restoration & maintenance
Inter-ecosystem flows

ECOSYSTEM CAPITAL: KEY POINTS

- Must measure/assess ecosystem condition and extent in physical terms since these underpin flows of ecosystem services
- Assessing ecosystem capacity and expected flows will relate to issues of sustainability and patterns of use
- Focus on a stable spatial area and changes in the state of that area
- Multiple services and multiple land managers in each area
- Intent to account for ecosystem degradation, enhancement and conversion – and distinguish human v natural impacts


LCEU type A
Ecosystem Accounting Unit
BSU
LCEU type C
LCEU type B
LCEU type A

STATISTICAL UNITS: KEY POINTS

- Ecosystem Accounting Unit (EAU)
  - Stable over time
  - Sufficiently large to be relevant for policy purposes
- Basic Spatial Unit (BSU)
  - Small areas – possibly formed by overlaying grid
  - Ideally the level at which data are organised
- Land Cover / Ecosystem functional Unit (LCEU)
  - Area defined by common set of ecological characteristics
  - Often focal point for measuring ecosystem services
- Through mapping can link to economic units – particularly at BSU level

MEASUREMENT ISSUES FOR ECOSYSTEM SERVICES

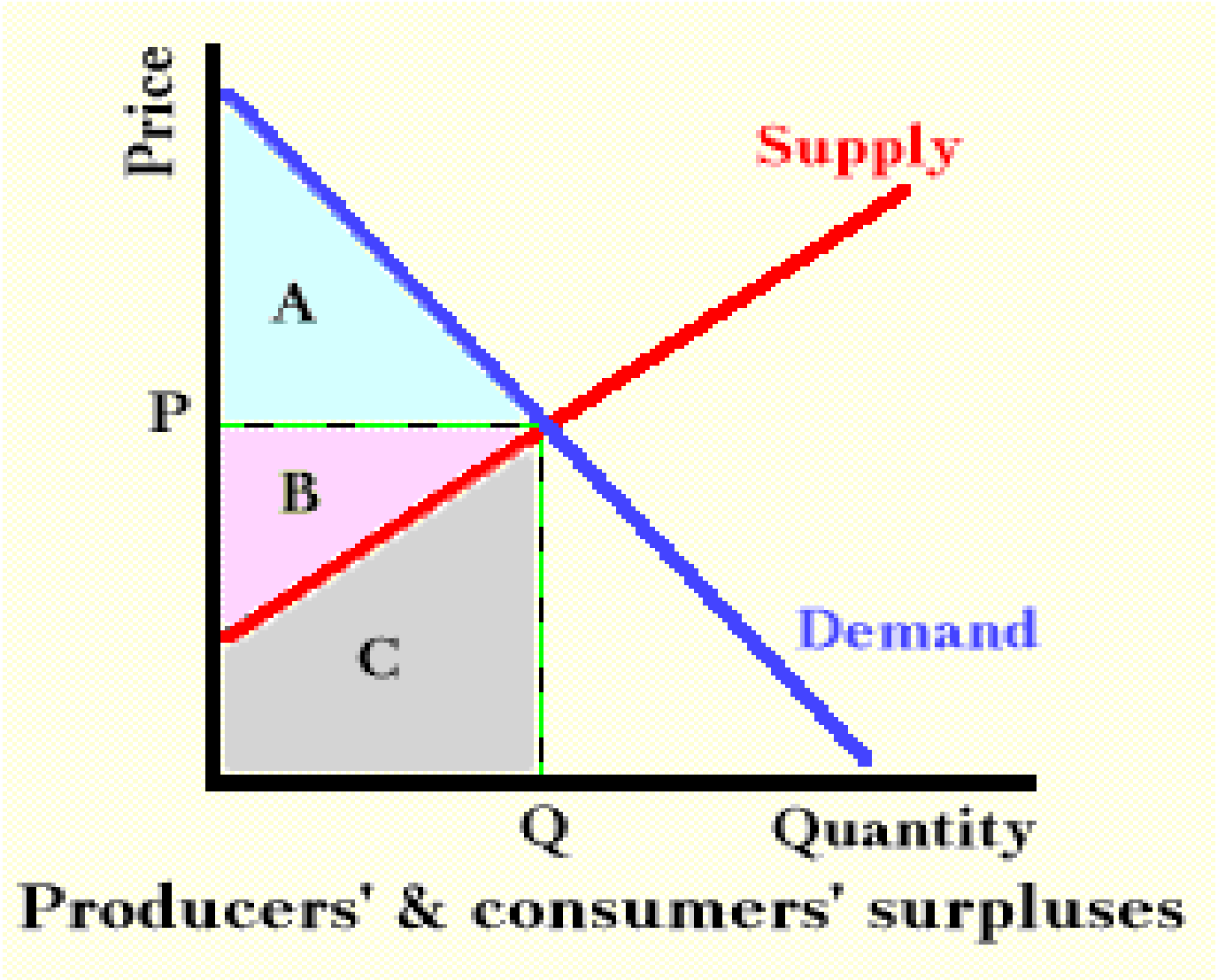
- Classification
  - Definition of “final” ecosystem services for cultivated biological resources (especially crops)
  - Placement of flows relating to mineral and energy resources, energy from renewable sources (wind, solar, etc), space provisioning services
- Aggregation
  - Defining possible approaches especially relevant weights
  - Distinguish aggregation within an ecosystem and aggregation for multiple ecosystems
- Links to intra- and inter- ecosystem flows

MEASUREMENT ISSUES FOR ECOSYSTEM CAPITAL

- Ecosystem condition
  - Defining suitable reference or benchmark conditions to form a basis for assessment
  - Incorporating notions of resilience and thresholds
- Expected ecosystem service flows
  - Defining links to overall ecosystem condition in terms of availability of services in the future
- Defining ecosystem degradation
  - Demand side and supply side notions of degradation
- Aggregation
  - Direct measurement of whole not possible but question of how to combine variety of indicators

APPROACHES TO VALUATION AND PRICING

- Motivation for valuation needs to be clear
  - Integration/comparison with accounts requires SEEA / SNA based values
- Concepts of value : welfare economic and exchange value
  - Accounting for consumer surplus
- Many approaches based on welfare economic valuation principles have been developed and tested for valuing ecosystem services
- Potential for market related prices to be used
- However, conclusions on consistency of methods with SEEA & SNA valuation principles still to be drawn


Price
Supply
A
P
B
C
Demand
Q
Quantity
Producers' & consumers' surpluses

ECOSYSTEM ACCOUNTING IN MONETARY TERMS

- Valuation of ecosystem degradation
  - Restoration cost as a deduction from economic aggregates
  - Change in valueof expected flows of ecosystem services
    - Use of NPV approaches (as explained in SEEA CF)
    - Assumes weak sustainability – i.e. substitutability of different types of capital
- Sequence of accounts
  - Aim to reflect entries for ecosystem services, and ecosystem degradation and enhancement in standard SNA accounts
  - Various models depending on characterisation of ecosystem with respect to economic units
  - Requires valuation of ecosystem services and uses extension of SNA production boundary

ECOSYSTEM ACCOUNTING IN MONETARY TERMS

- Wealth accounting
  - Extension of SNA balance sheet to incorporate aspects of the value of ecosystems not in SNA
  - Care needed to understand current coverage of valuation in SNA to avoid double counting, especially for land
- Combined presentations
  - Following SEEA CF potential exists to present physical and monetary data together.
  - E.g. physicalmeasuresof ecosystem services or change in condition against environmental protection expenditure or industry value added
- Accounting for payments for ecosystem services

SUMMARY

- Significant progress has been made
- Solid convergence towards core concepts, terminology and possible measurement approaches noting the need to allow experimentation in methods
- The key ongoing tasks are
  - Discussion of the accounting concepts and approaches with multiple stakeholders across multiple disciplines
  - Highlighting the important role of official statisticians in advancing this work