



A FRAMEWORK FOR VALUATION OF ECOSYSTEM ASSETS

Carl Obst, IDEEA Group

Presentation to the EMG Workshop 2019

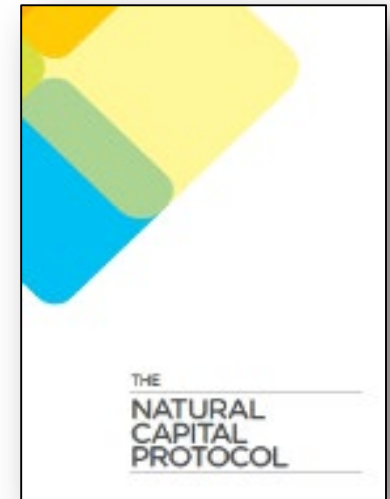
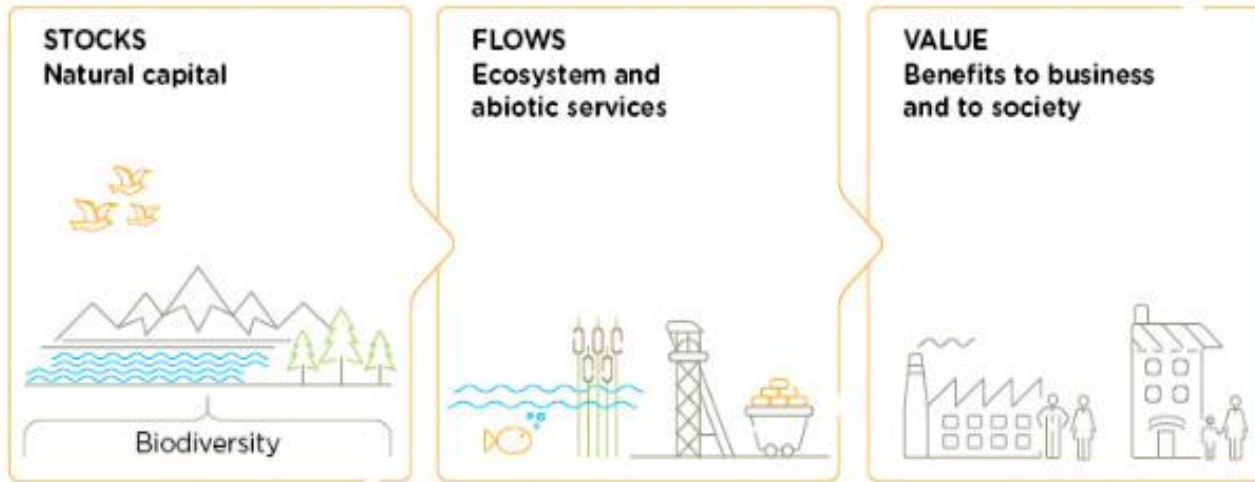
UNSW, Sydney

6 December, 2019

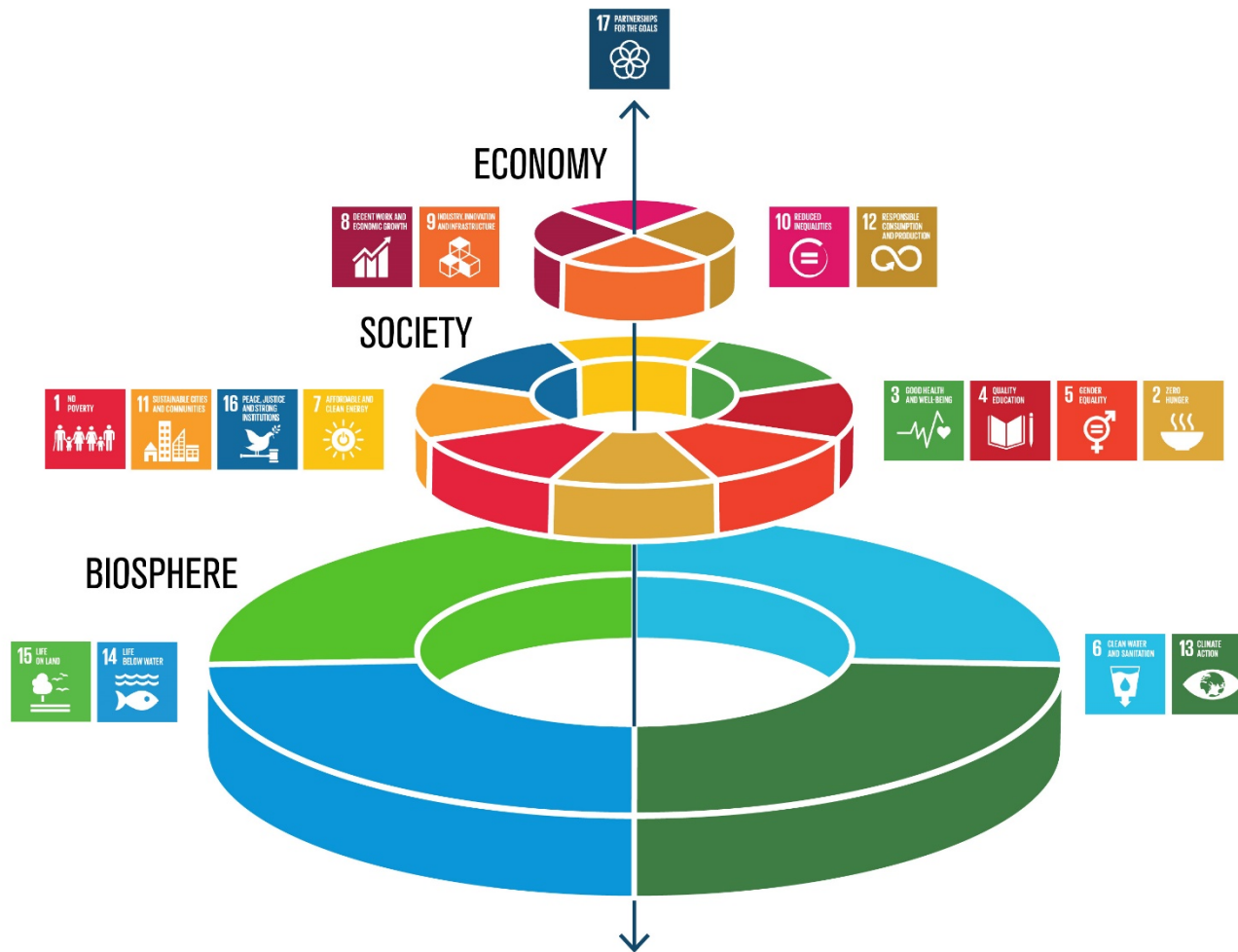
DEFINING NATURAL CAPITAL

Natural Capital

is the **stock** of renewable and non-renewable **natural resources**, (e.g. plants, animals, air water, soils, minerals) that **combine** to yield a **flow** of benefits to people

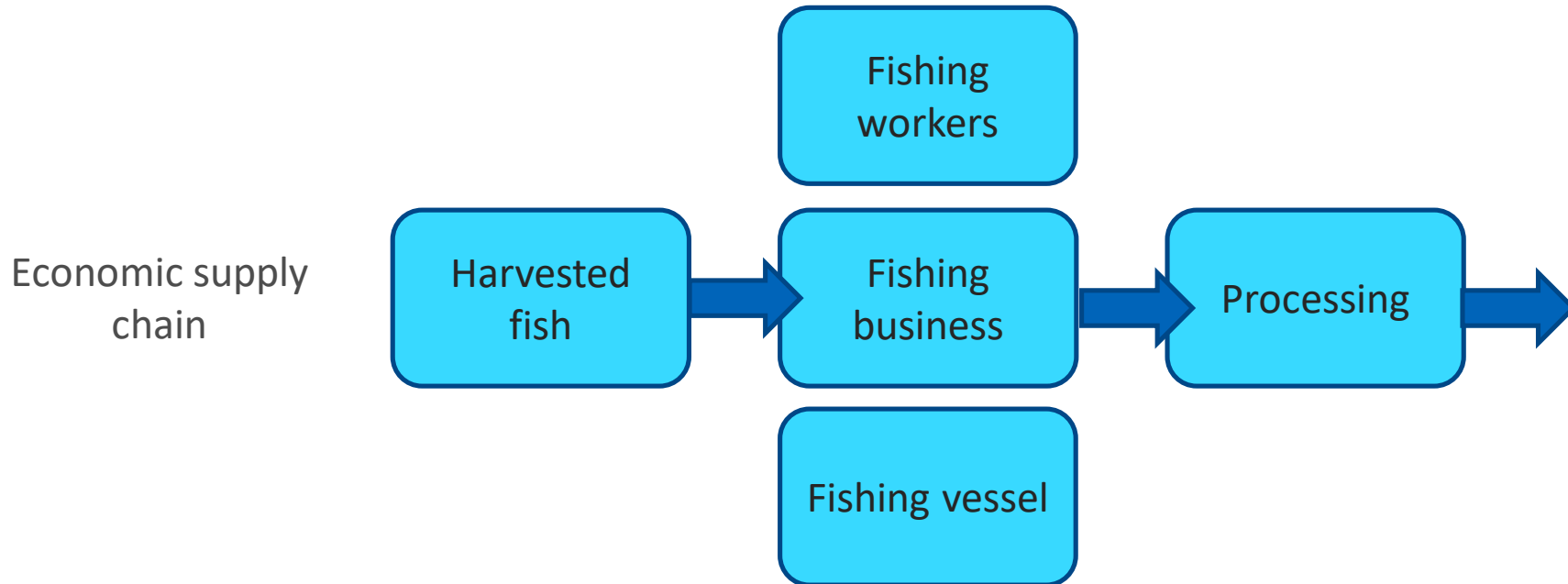


NATURAL CAPITAL AND SUSTAINABLE DEVELOPMENT

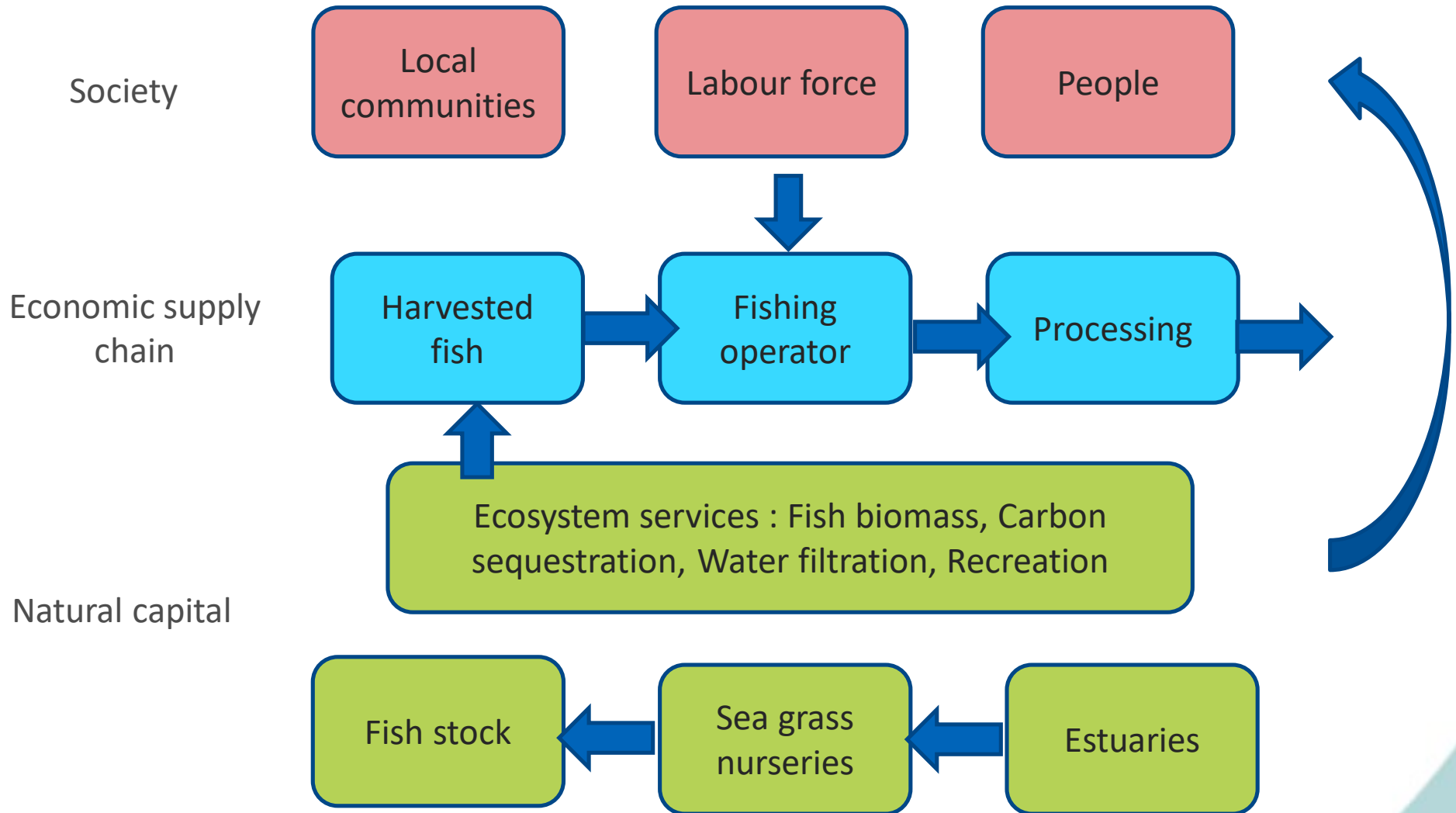


Graphics by Jerker Lokrantz/Azote

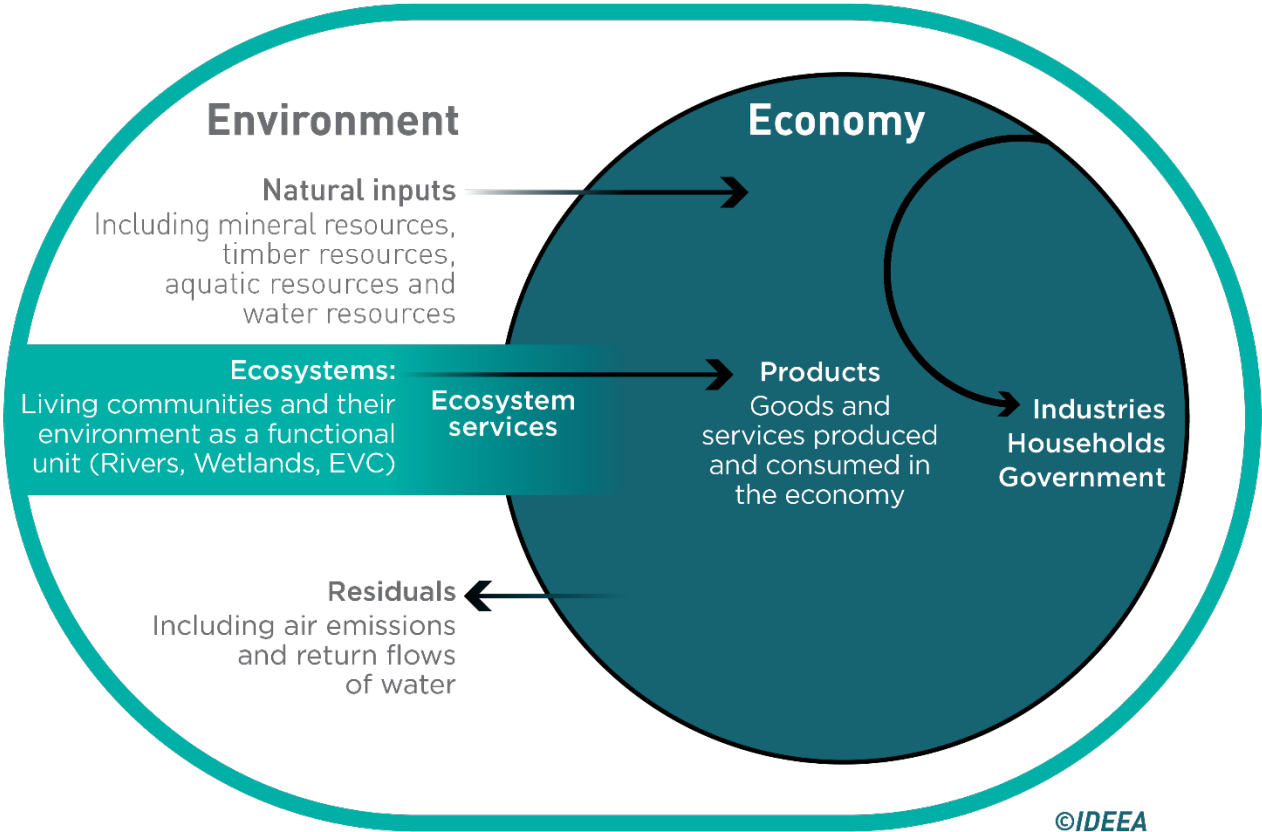
TRADITIONAL ECONOMIC SYSTEM



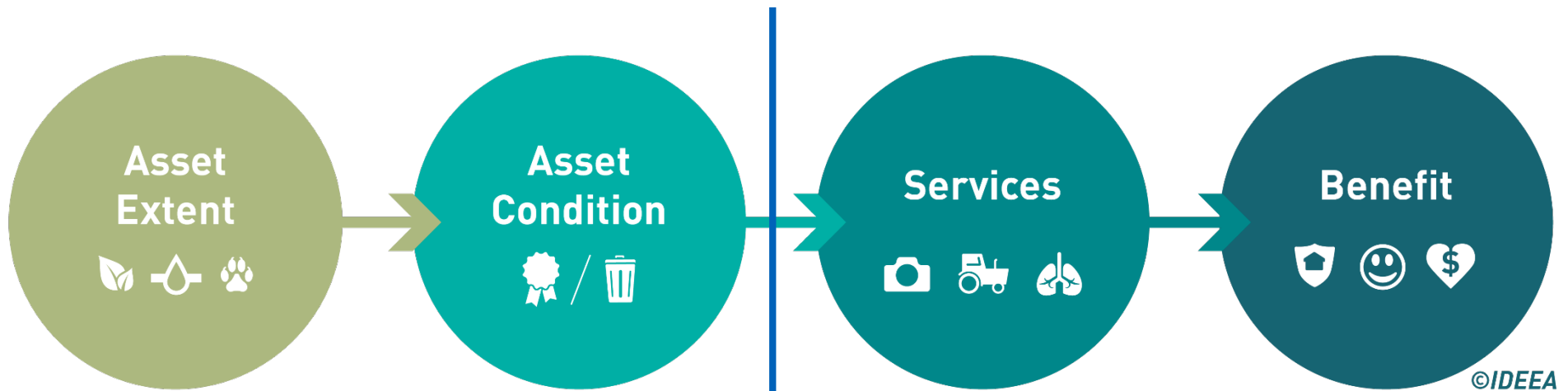
INTEGRATED SYSTEM



LINKING ENVIRONMENTAL AND ECONOMIC SYSTEMS



CORE ECOSYSTEM ACCOUNTING MODEL



Stocks:

forests, wetlands,
rivers, seagrass
beds, reefs

Flows:

timber, fish, carbon,
water, habitat,
recreation, amenity

ACCOUNTING FOR FORICO'S ECOSYSTEM ASSETS

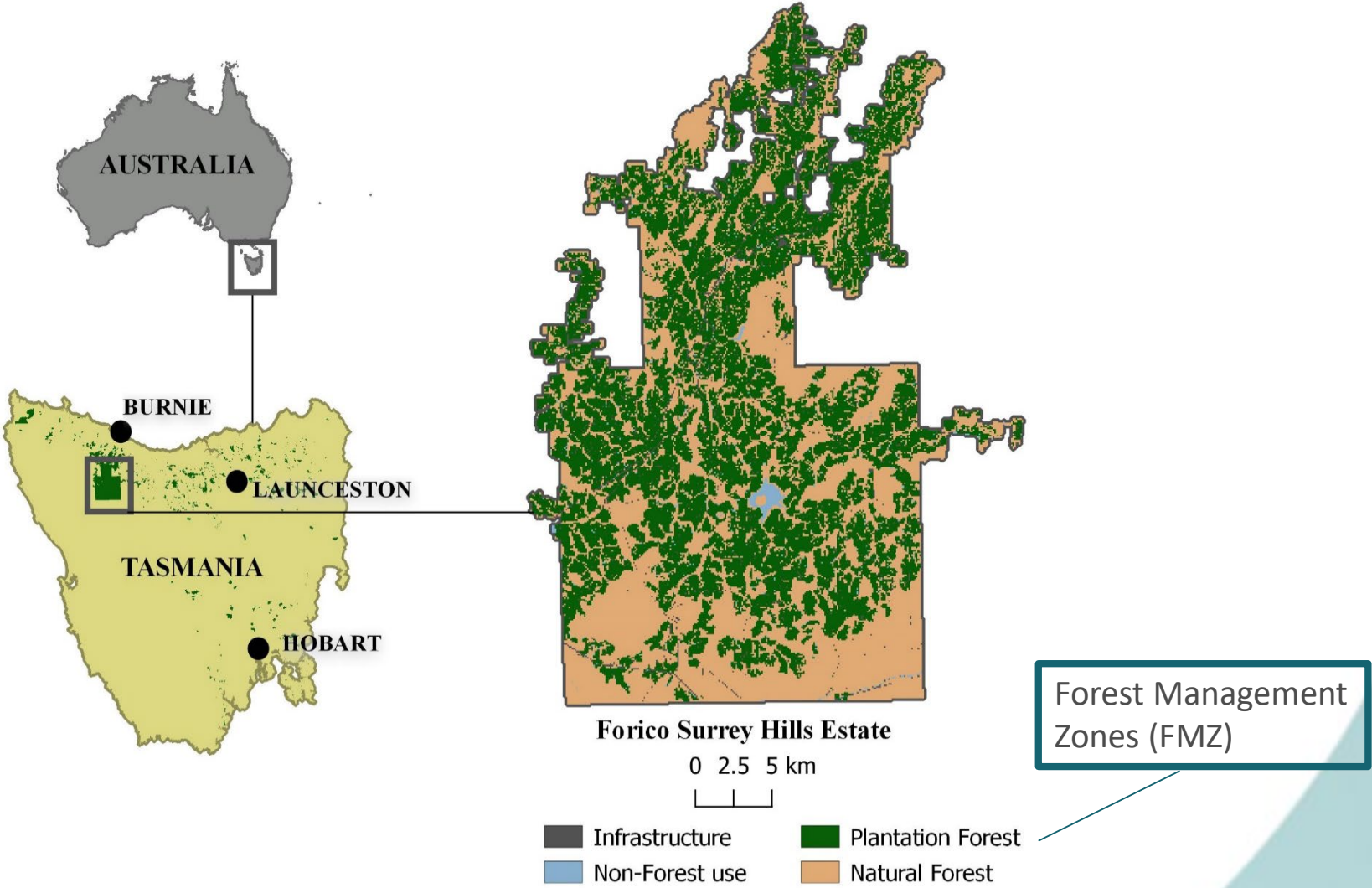
FORICO: “MAKING EVERY HECTARE COUNT”

Using parts or all of the integrated ecosystem accounting data set (physical and monetary data) Forico envisages support for:

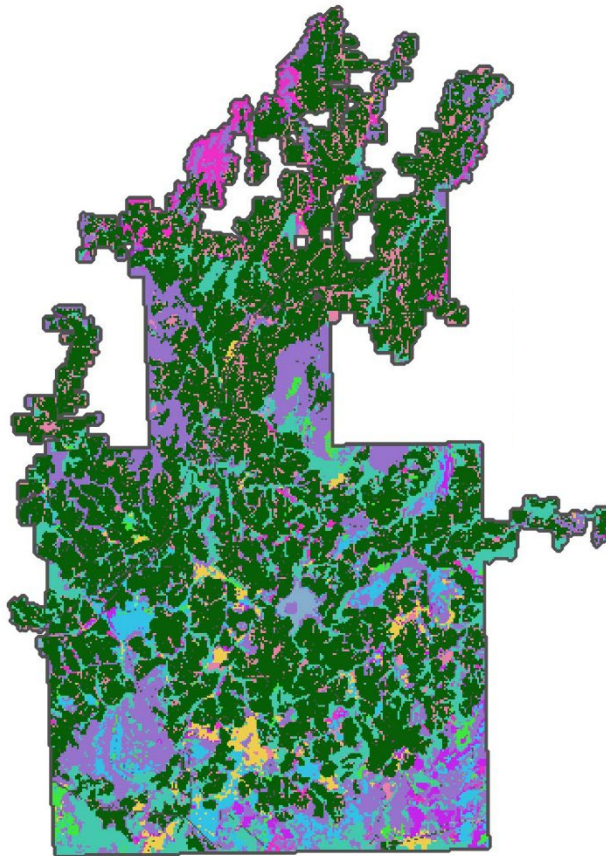
- Land management/trade-off analysis - optimisation assessment
- Stakeholder engagement – recognising spatial context and multiple values
- Non-financial reporting – e.g. corporate sustainability reports; certification (FSC); State of the Forests reporting
- Identify new revenue opportunities: Environmental markets (carbon, habitat management); Green finance

Other options include scenario and risk analysis (e.g. impacts of climate change); supply chain analysis – ecosystem “footprints”; integrated spatial planning: e.g. with agriculture; social cost-benefit analysis

FORICO CONTEXT



OVERLAYING ECOSYSTEM TYPES



Natural FMZ

- Agricultural, urban and exotic vegetation
- Dry eucalypt forest and woodland
- Highland and treeless vegetation
- Moorland, sedgeland, rushland and peatland
- Native grassland
- Non eucalypt forest and woodland
- Other natural environments
- Rainforest and related scrub
- Saltmarsh and wetland
- Scrub, heathland and coastal complexes
- Wet eucalypt forest and woodland

FMZ (non natural)

- Plantation
- Infrastructure
- Non-forest use

Forico Surrey Hills Estate

0 2.5 5 km



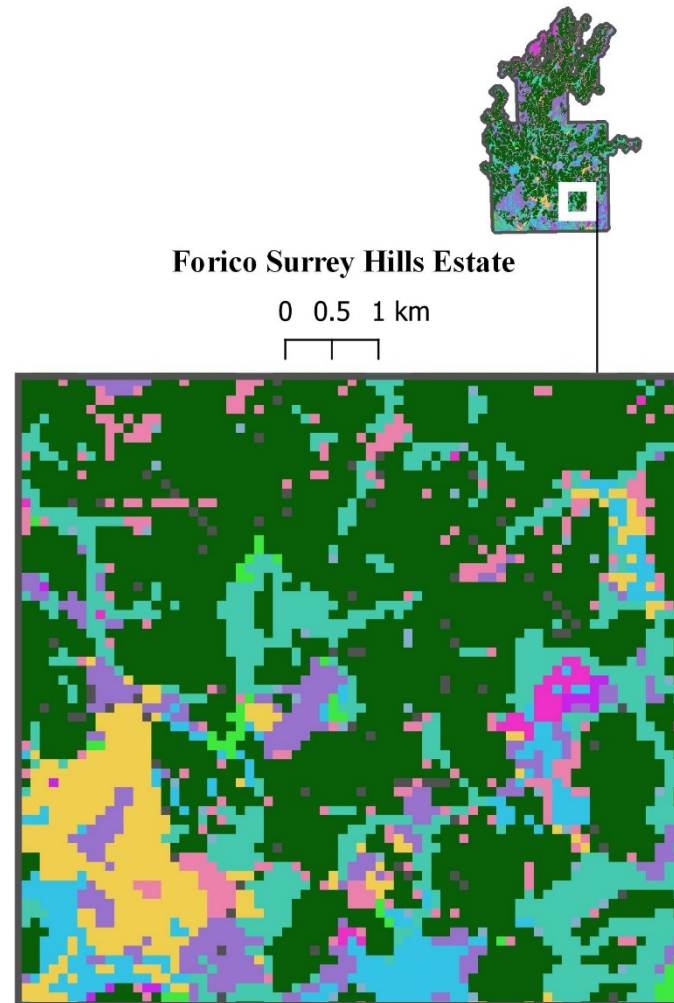
DEFINING ECOSYSTEM ASSETS

Natural FMZ

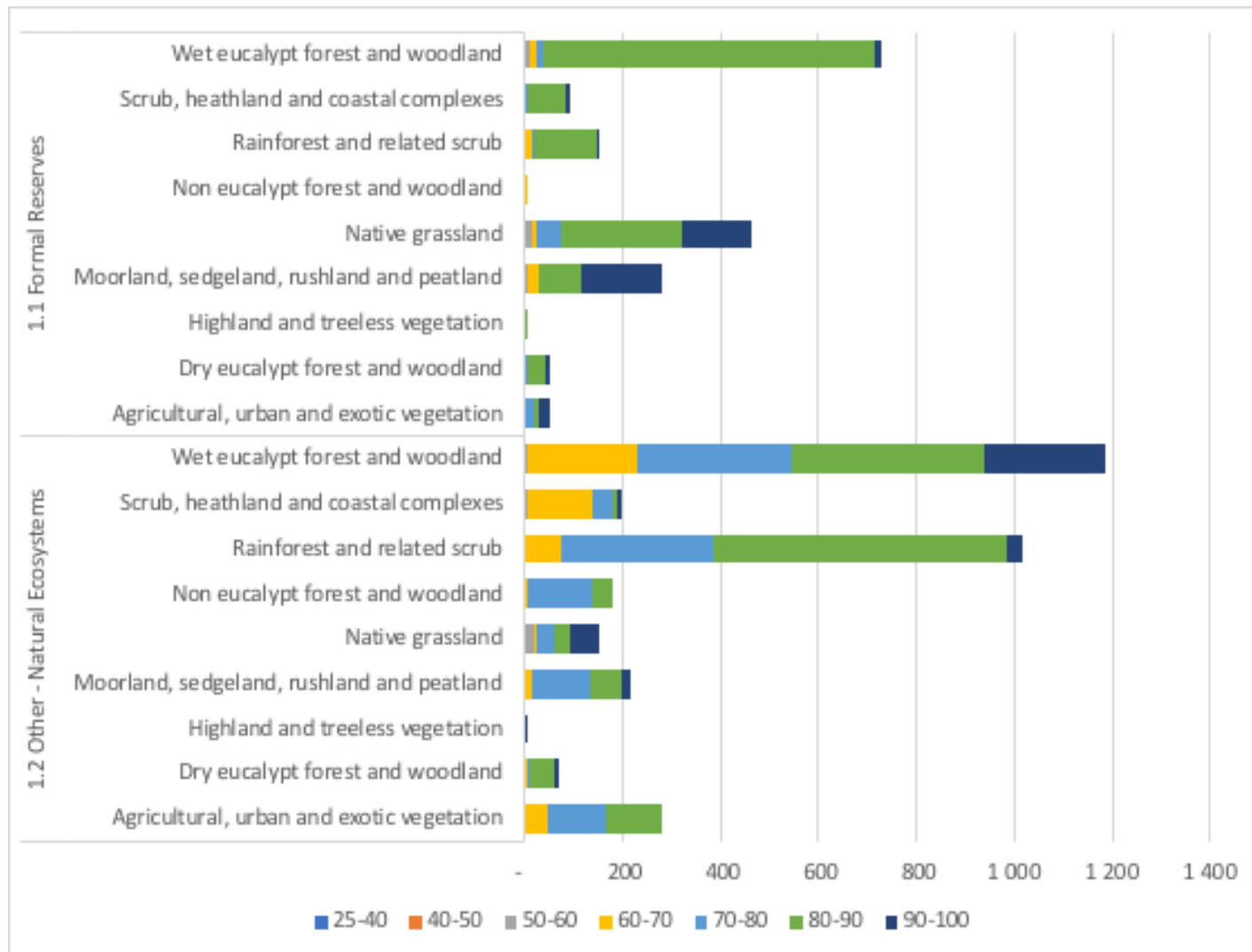
- Agricultural, urban and exotic vegetation
- Dry eucalypt forest and woodland
- Highland and treeless vegetation
- Moorland, sedgeland, rushland and peatland
- Native grassland
- Non eucalypt forest and woodland
- Other natural environments
- Rainforest and related scrub
- Saltmarsh and wetland
- Scrub, heathland and coastal complexes
- Wet eucalypt forest and woodland

FMZ (non natural)

- Plantation
- Infrastructure
- Non-forest use

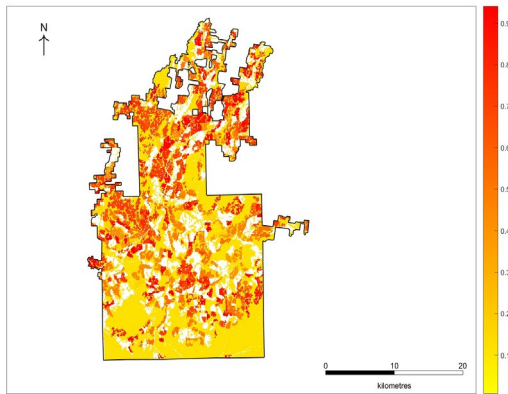


VEGETATION CONDITION ASSESSMENT (VCA) BY ECOSYSTEM TYPE, 2017



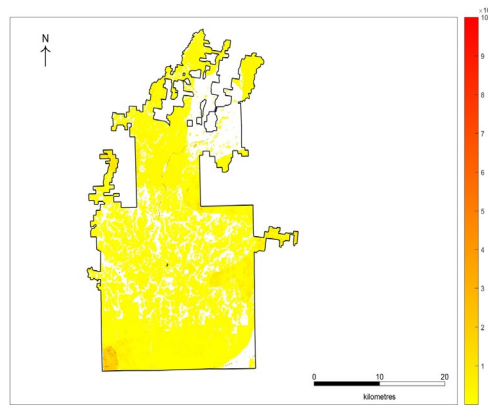
SPATIAL DISTRIBUTION OF ECOSYSTEM SERVICES

Carbon sequestration



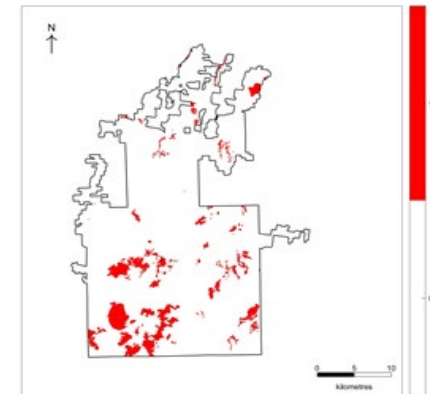
produced using EnSym

Water provisioning



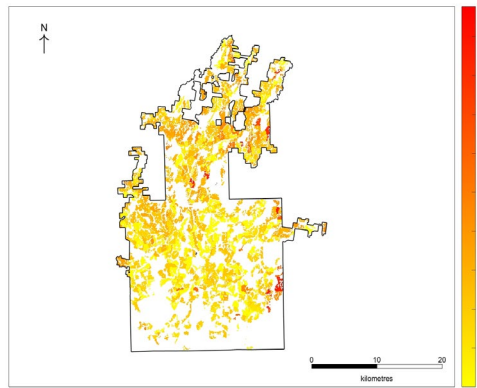
produced using EnSym

Habitat provisioning



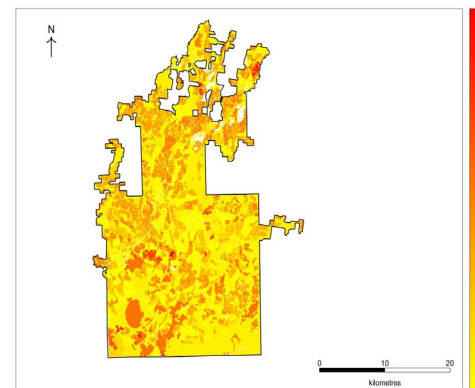
produced using EnSym

Timber provisioning



produced using EnSym

All services (normalised)



produced using EnSym

ASSET TYPE LINKED TO SUPPLY OF SERVICES (PHYSICAL)

Class	Area 2017 (ha)	Timber 2017 (tonnes)	Carbon 2017 (tonnes)	Water 2015 (mL)	Habitat 2016 (ha)
Greater Surrey Hills					
1. Natural					
1.1 Formal Reserves					
1.2 Other - Natural Ecosystems					
Total					
2. Plantation					
2.1 Hardwoods					
2.2 Softwoods					
2.3 Not planted					
2.4 Failed Tree Farm					
Total					
3. Non-Forest Use					
3.1 Firebreak					
3.2 Plantation Buffer					
3.3 Water body					
Total					
4. Infrastructure					
4.1 Infrastructure					
4.2 Quarries and gravel pits					
4.3 Roads					
Total					
Greater Surrey Hills Total					

RECORDING FLOWS OF ECOSYSTEM SERVICES

Ecosystem service	SUPPLY/ PRODUCTION			USE	
	Ecosystem assets			Internal	External
	Plantation	Native forests		Forestry business	Government / Household
		Eucalypt	Heathland		
Timber	X			X	
Habitat	X	X	X		X
Carbon seq.	X	X	X		X
Recreation		X	X		X

ASSET TYPE LINKED TO SUPPLY OF SERVICES (MONETARY)

Class	Area 2017 (ha)	Timber 2017 \$	Carbon 2017 \$	Water 2015 \$	Habitat 2016 \$	Total \$
Greater Surrey Hills						
1. Natural						
1.1 Formal Reserves						
1.2 Other - Natural Ecosystems						
Total						
2. Plantation						
2.1 Hardwoods						
2.2 Softwoods						
2.3 Not planted						
2.4 Failed Tree Farm						
Total						
3. Non-Forest Use						
3.1 Firebreak						
3.2 Plantation Buffer						
3.3 Water body						
Total						
4. Infrastructure						
4.1 Infrastructure						
4.2 Quarries and gravel pits						
4.3 Roads						
Total						
Greater Surrey Hills Total						

VALUATION OF ECOSYSTEM ASSETS

CONTEXT: REVISION OF THE SEEA EEA

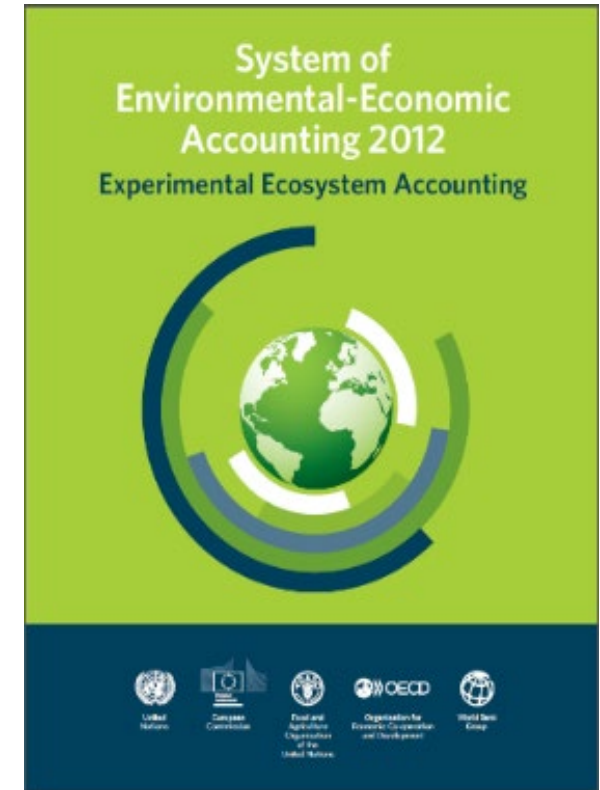
Initial SEEA Experimental Ecosystem Accounting (EEA) released in 2013

Substantial interest and progress since 2013 – up to 40 countries with ecosystem accounting projects at multiple scales

Drawing together of experts geography, ecology, ecosystem services, environmental economics and accounting has highlighted the potential for improvement and clarifying issues

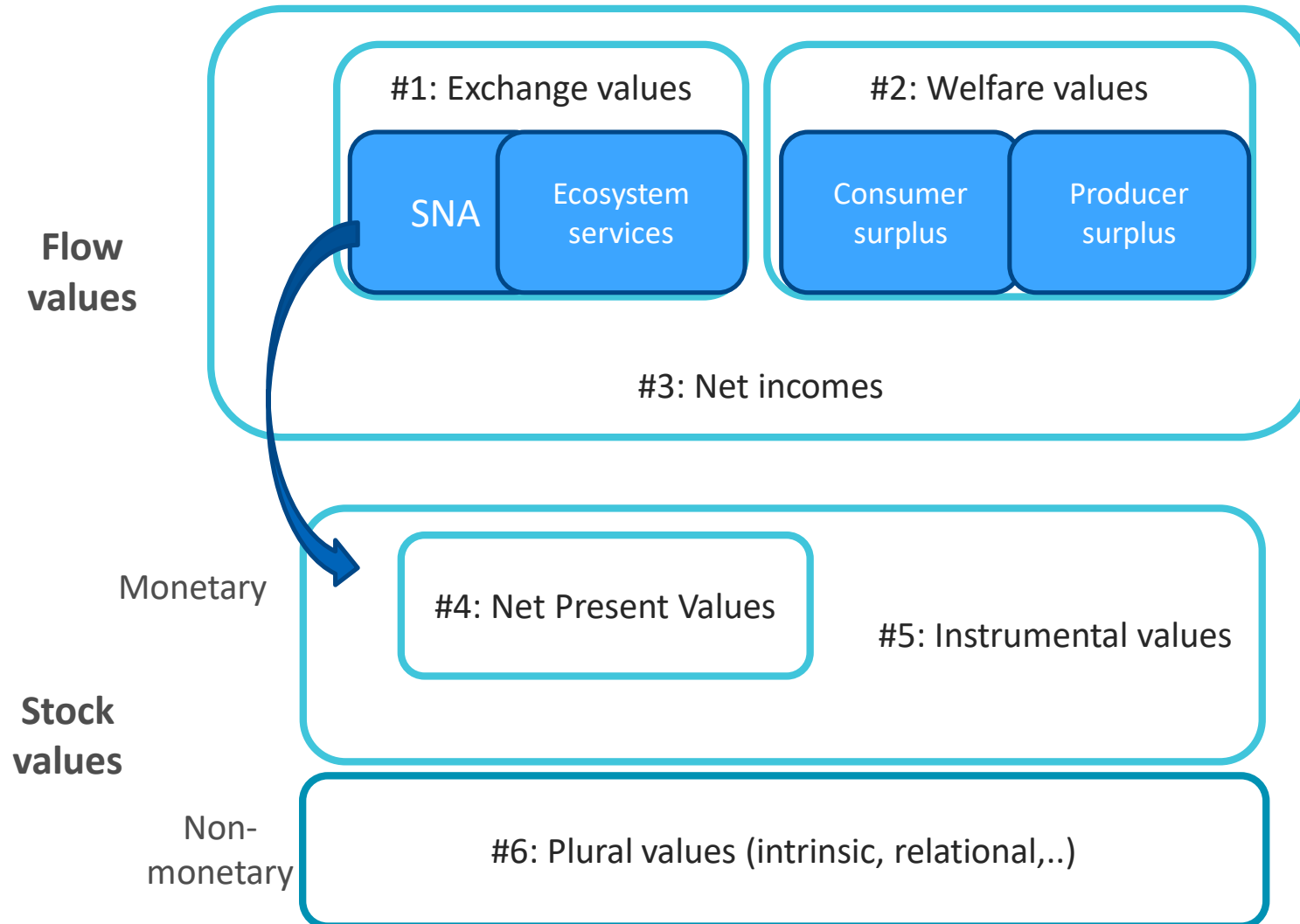
Revision process commenced in 2018 to be concluded at end 2020

Valuation of ecosystem assets a key issue



WHICH VALUE? PLACING ACCOUNTING VALUES IN CONTEXT

A first attempt



DEFINING ASSET VALUES FOR ACCOUNTING

Asset values are net present value of expected incomes

Key question is what is the scope of income:

- Marketed output -> Means
- Non-market output -> Ends
- Clarify the link to welfare
 - Distributional considerations can become relevant in defining scope

Broadening scope to natural capital is not sufficient, need to determine the relevant set of incomes/benefits to be incorporated

Challenge for SEEA is that one asset can have multiple income streams

ESTIMATING ASSET PRICES

Asset price is the marginal change in value associated with a change in the underlying stock

Key issues for natural capital:

- Future / expected changes in income
 - Ecological and human factors need to be considered – can't assume steady state
 - Links to concepts of ecosystem condition & capacity and ecological production functions
- Discount rates
- Capital gains
- Institutional context
 - Optimal / Sustainable / Expected
- Aligning stocks, income flows, ownership and beneficiaries
 - Separability of different ecosystem services
 - Negative incomes / Degradation
 - Links to observed land prices

KEY MESSAGES AND NEXT STEPS

1. Need the rigour from the index number and productivity community to be applied to non-market valuation of natural capital
 - Test and clarify assumptions and techniques
 - Aggregation is a key consideration
2. Spatial data is essential - this is generally available but fragmented.
3. Need to integrate ecological knowledge – this is available but needs engagement and discussion
4. Decisions on scope of valuation for SEEA will be a balance of measurability and relevance
5. Placing environmental values in broader context is essential

All contributions welcome – see <https://seea.un.org/ecosystem-accounting>



Accounting for ecosystem outcomes

www.ideeagroup.com