



Big Data & Ecosystem Accounting

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Outline:

- ❑ Big Data for official statistics and ecosystem accounts
- ❑ Advancing Natural Capital Accounting through SEEA-EEA:
 - with Generic technical guidance and training materials
 - applications in pilot countries
- ❑ Global and continental applications



1. Big Data for official statistics and ecosystem accounts

Pilot areas to explore the use of satellite imagery and geospatial data :

Each study area may include the following :

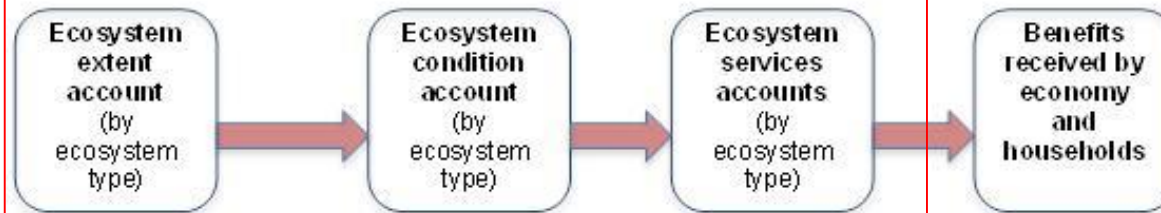
Evaluated data sets based on the following criteria:

1. Dataset, type and format
2. Subject/purpose of the satellite
3. Spatial resolution
4. Time series availability
5. Sensor and Satellite
6. Coverage: Global, regional or national?
7. Cost: free or commercial?

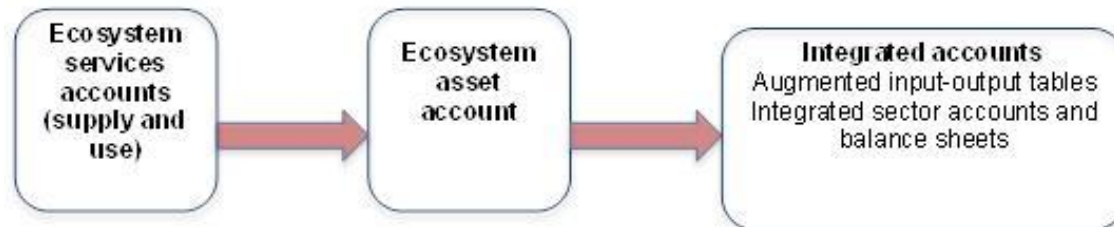


2. Advancing SEEA-EEA: generic guidelines for pilot countries

a. Steps in physical terms



b. Steps in monetary terms



- Generic technical guidance
- Strong on concepts and structure, but yet weaker on methods and data inputs
- Experimentation
- Physical accounts in focus first



2. Advancing SEEA-EEA

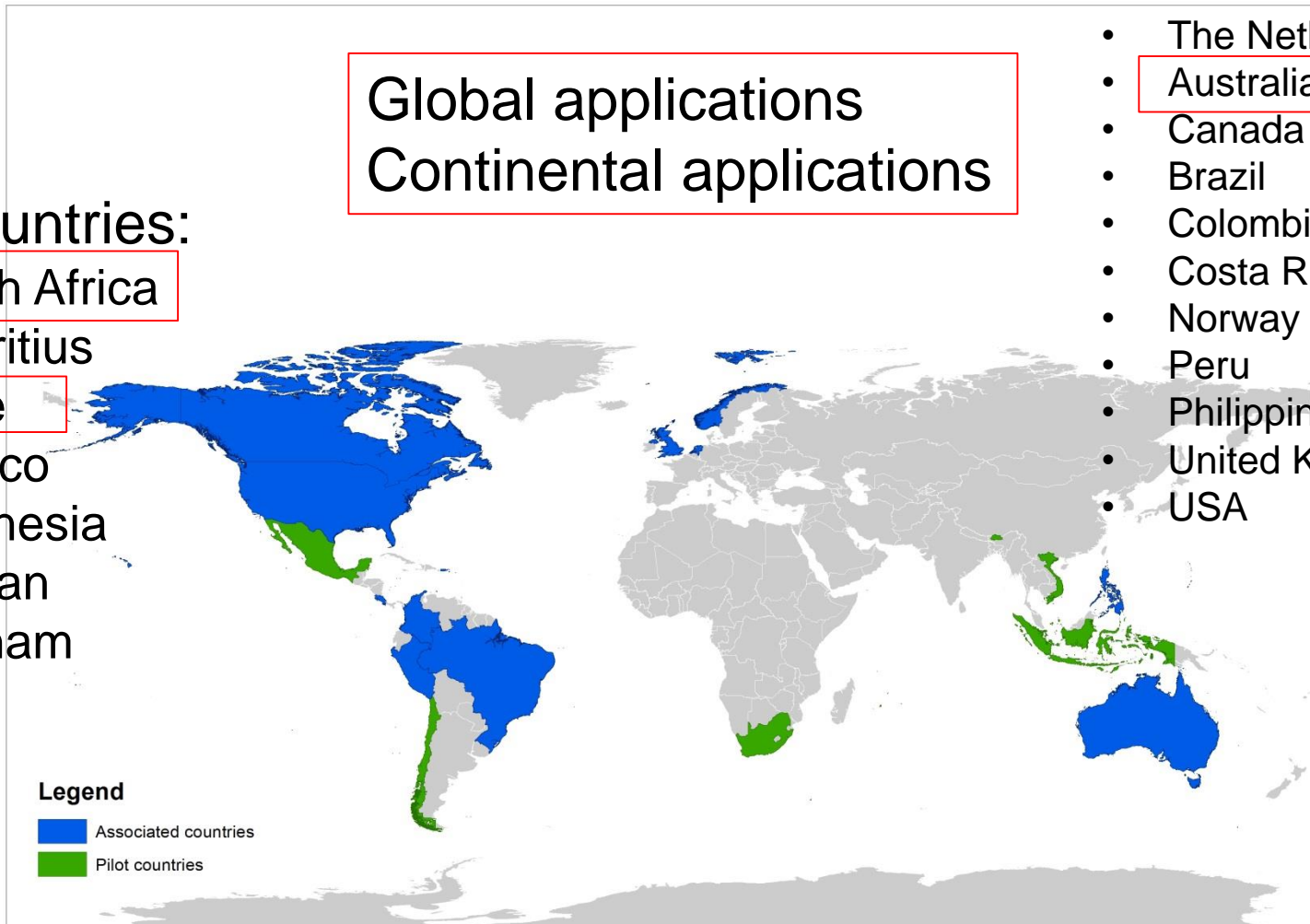
Associated countries:

- The Netherlands
- Australia
- Canada
- Brazil
- Colombia
- Costa Rica
- Norway
- Peru
- Philippines
- United Kingdom
- USA

Global applications
Continental applications

Pilot countries:

1. South Africa
2. Mauritius
3. Chile
4. Mexico
5. Indonesia
6. Bhutan
7. Vietnam

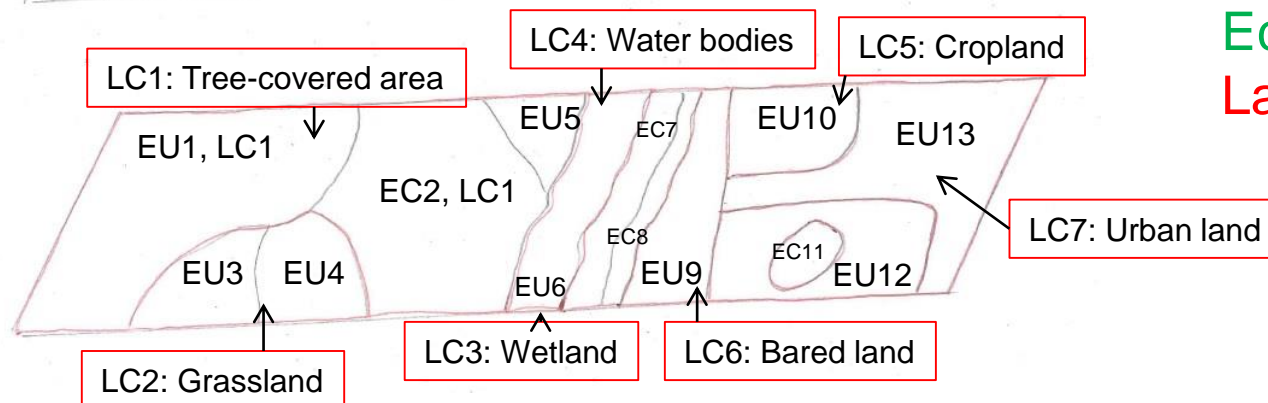


Legend
Associated countries
Pilot countries



2. Defining, classifying and mapping ecosystem units

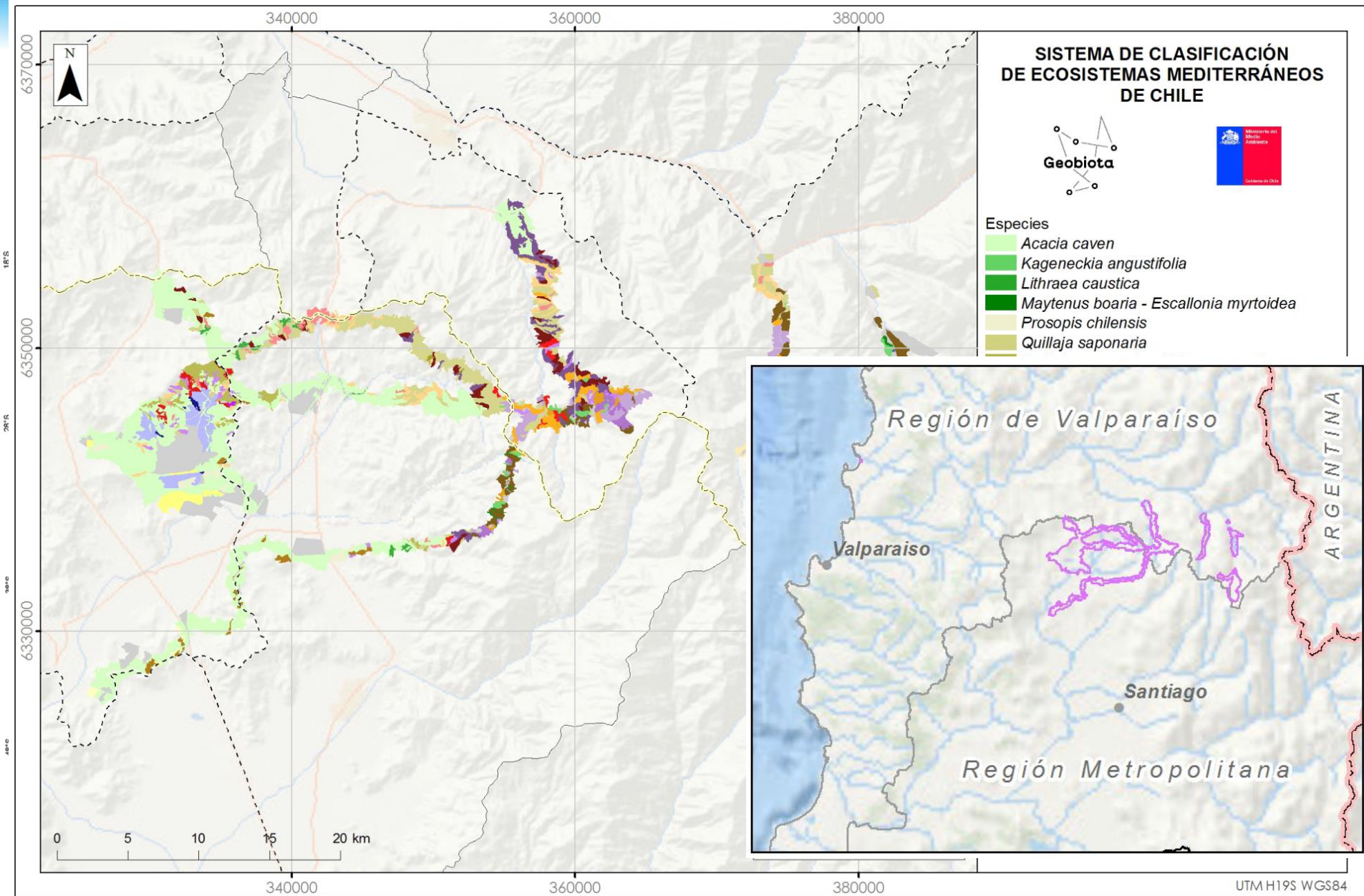
- Vegetation/habitat/biotope classification methods
- Mapping based on field work (existing inventories) aided by high-resolution remote sensing

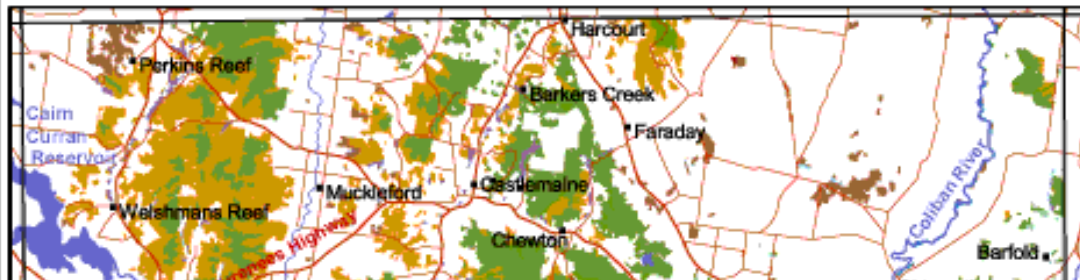


Ecosystem Unit = EU
Land cover = LC



System of Environmental-Economic Accounting





Castlemaine 1: 100 000 mapsheet

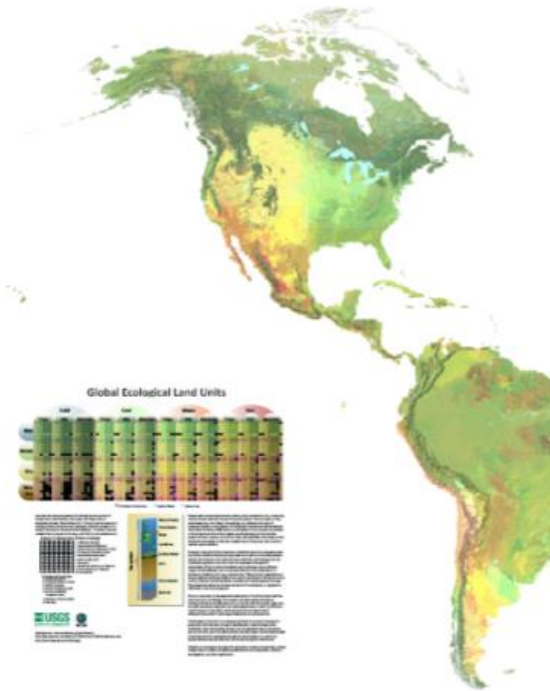
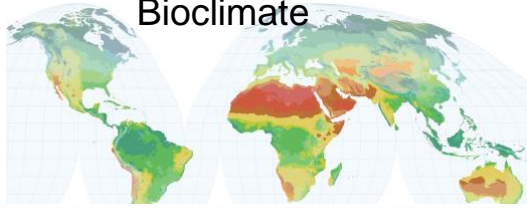
Groups of Ecological Vegetation Classes (EVC)

EVC Group
 Box Ironbark Forests or Woodlands - dry and/or lower fertility (95%)

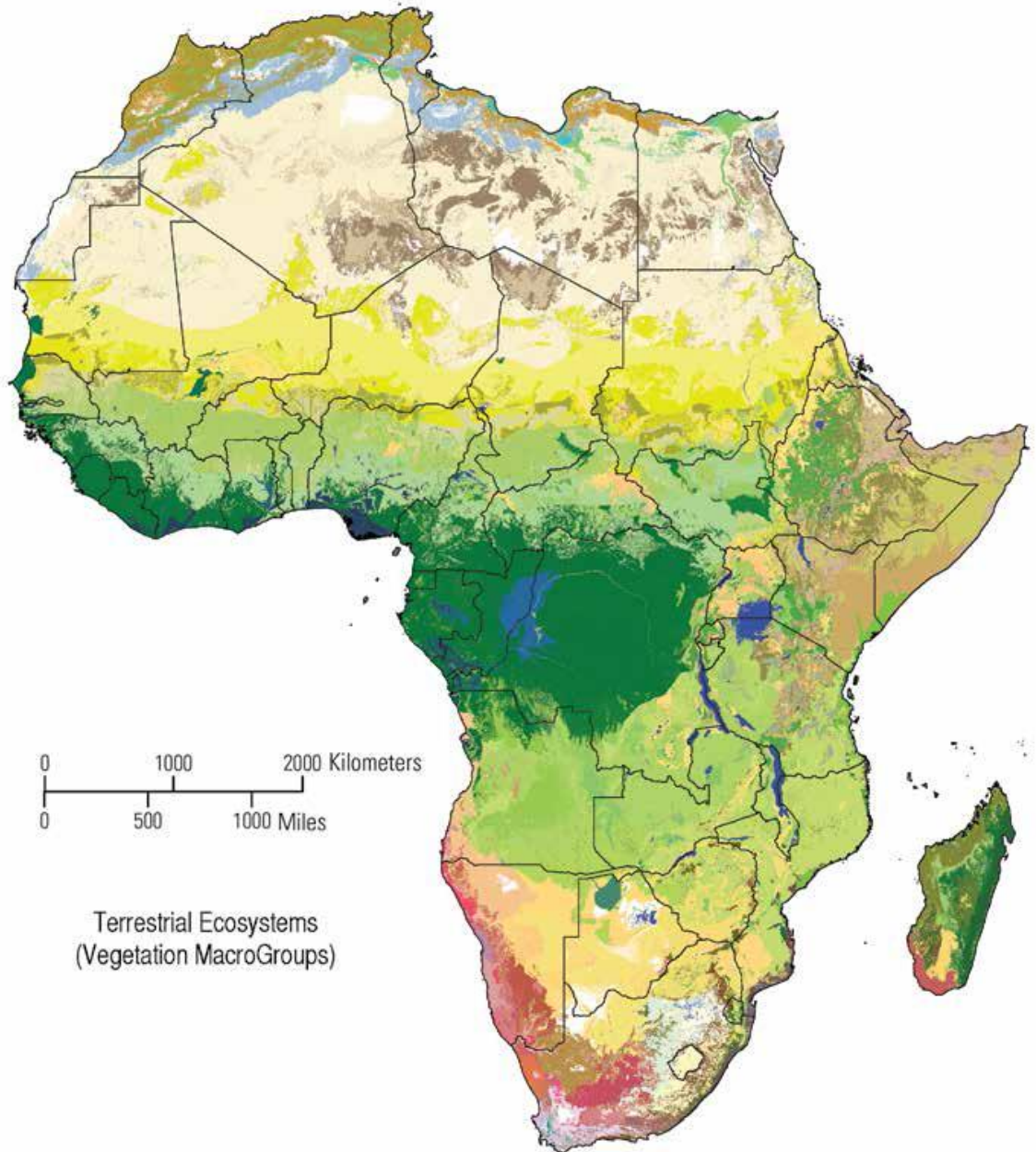
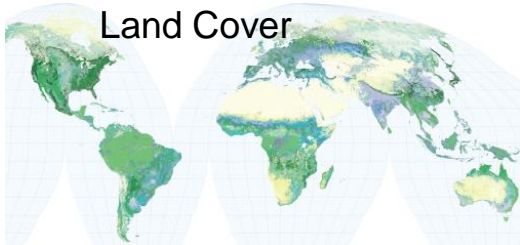
	1 Artificial surfaces (including urban and	2 Herbaceous crops	3 Woody crops	4 Multiple or layered crops	5 Grassland	6 Tree-covered areas	7 Mangroves	8 Shrub-covered areas	9 Shrubs and/or herbaceous vegetation,	10 Sparsely natural vegetated areas	11 Terrestrial barren land	12 Permanent snow and glaciers	13 Inland water bodies	14 Coastal water bodies and intertidal areas	TOTALS
Opening Stock of Resources	14859	193019	0	14	135772	16830	0	11	504	0	0	0	9859	0	370868
Additions to stock															
Managed expansion						3408									3408
Natural Expansion															0
Upward reappraisals						120									120
<i>Total additions to stock</i>															0
Reductions in stock															
Managed regression			3408												3408
Natural Regression															0
Downward reappraisals	112												8		120
<i>Total reductions in stock</i>															0
Closing stock	14747	189611	0	14	135772	20358	0	11	504	0	0	0	9851	0	370868



Bioclimate



Land Cover



Terrestrial Ecosystems
(Vegetation MacroGroups)



7. Mapping ecosystem carbon accounts in EU

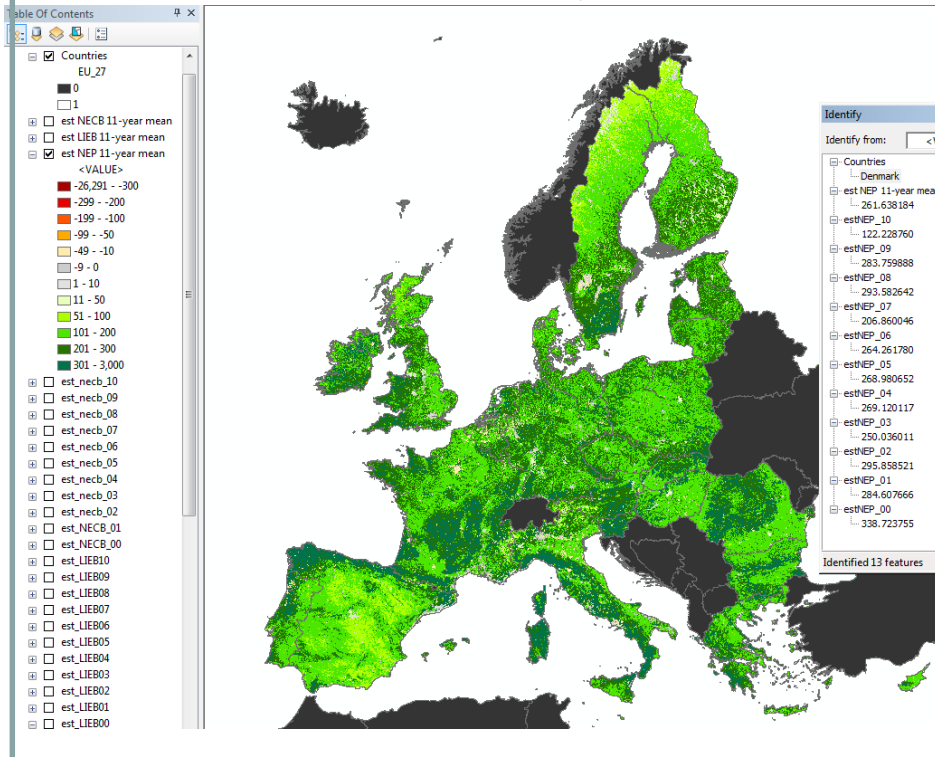
Carbon Accounting items	Data sources
Opening Stocks	1. Soil organic carbon (SOC) JRC map of SOC (Hiederer and Köchy, 2012), global at 1km, 30 cm and 1m depth; EEA estimate of SOC, 30cm
	2. Biomass (TCB) Downscaled forest biomass by EEA Upscaled biomass for non-forest biomass by EEA
Fluxes and transfers	3. Primary production (GPP) Downscaled NASA-CASA NPP (from 8km to 1km), converted to GPP by adding autotrophic respiration from MODIS (Running et al.)
	4. Carbon release / respiration (TER) Downscaled NASA-CASA Soil respiration (from 8km to 1km), converted to TER by adding autotrophic respiration from MODIS (Running et al.)
	5. Human use of primary production (TPPU) Downscaled regional statistics on crops (EUROSTAT), timber (EFISCEN, National FI and EFIMED) and grazing livestock, using land-cover and vegetation indices
	6. Carbon imports (TCR) Downscaled deposition of dry sludge and manure (from livestock distribution)
Balances	7. NEP, Ecosystem carbon balance (NECB) NEP estimated from GPP and TER, NECB estimated by aggregating all flows



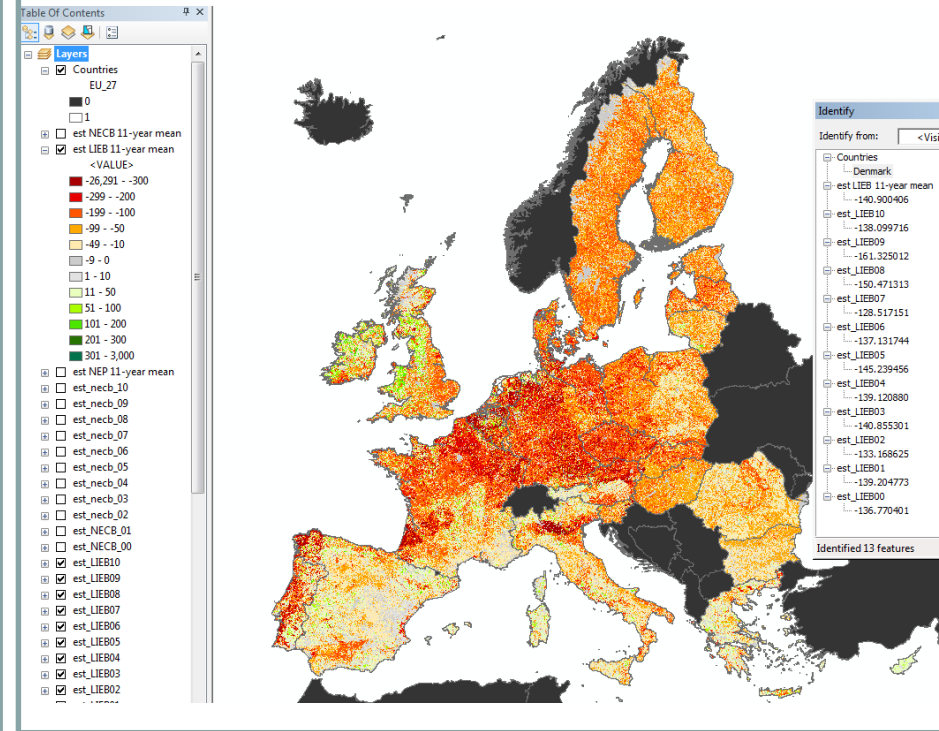
Balancing estimates

The two basic balancing items are designed to summarize 'vertical' and 'horizontal' carbon transfers

Net ecosystem production = Gross Primary Production – Terrestrial Ecosystem Respiration

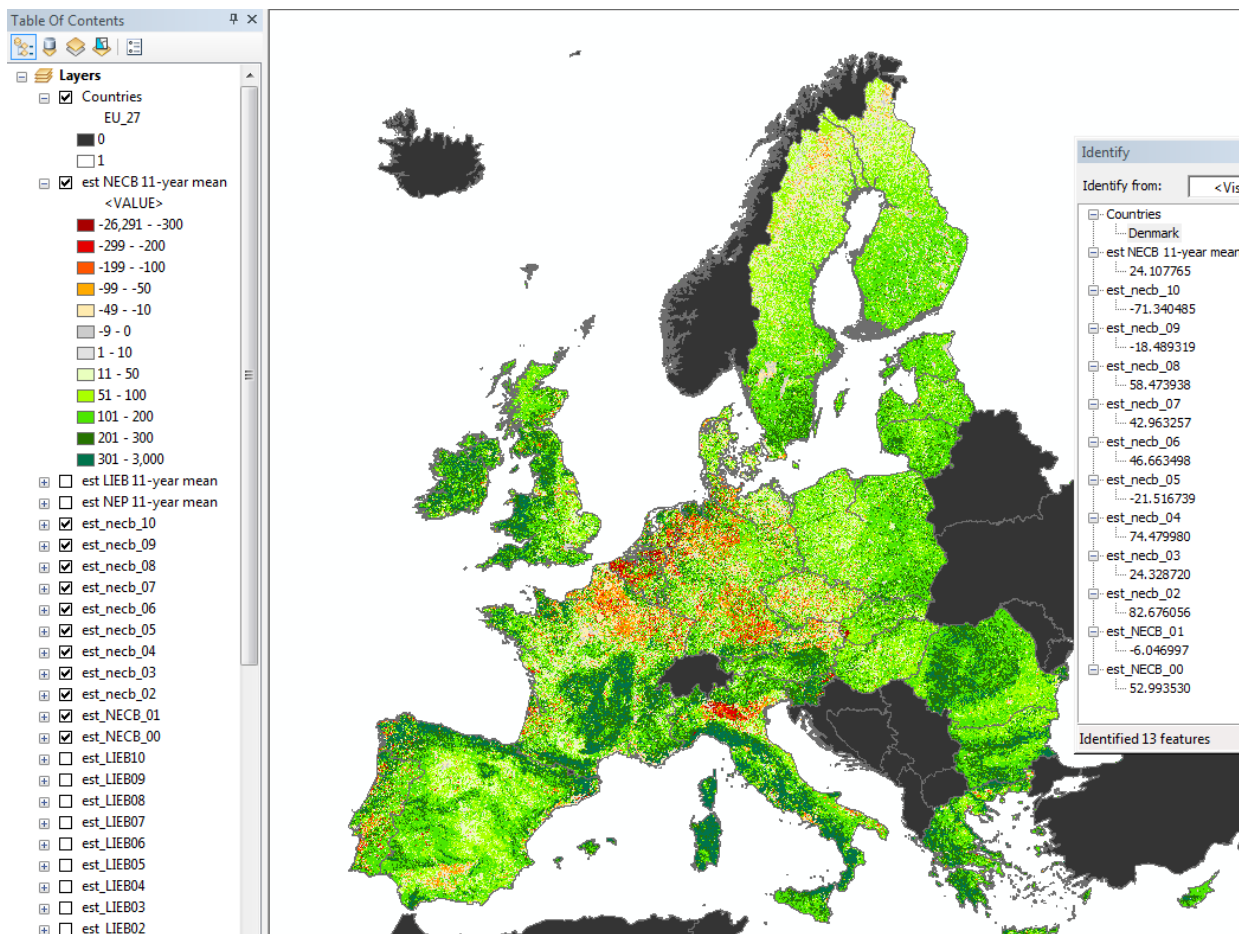


Balance of lateral imports and exports = Carbon returns – carbon 'uses'





Estimation of NECB – Sinks and sources!



The maps shows a decade average, with areas in green indicating prevailing sink (most of Europe) and in red – prevailing source functions (e.g. parts of North West Europe, Po valley in Italy, and spots of forest-burned areas of Portugal).

Statistics can be extracted on the carbon storage and sequestration at various scales and units, for example countries, NUTS, protected areas etc



7. Concluding remarks

- ❑ Strong movement to expand from land-cover to stronger ecological foundations
- ❑ Scale
 - Work is being done at many scales
 - Challenge is linking classifications across scales and geographical domains
- ❑ Common methods for mapping ecosystem units are emerging
- ❑ Accounting criteria useful for improving consistency, comparability and methodological standardization
- ❑ Challenges related to estimating error in both spatial and tabulated data
- ❑ Sinks and sources
 - Spatial link to supply and use accounts



Thank You!

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