Ecosystem Services and Air Pollution

A conceptual approach

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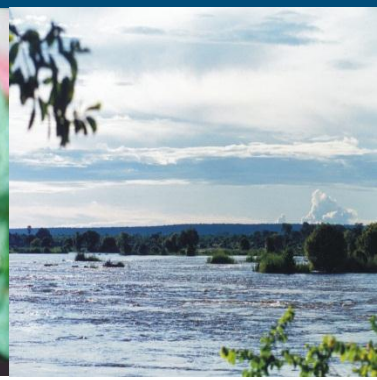

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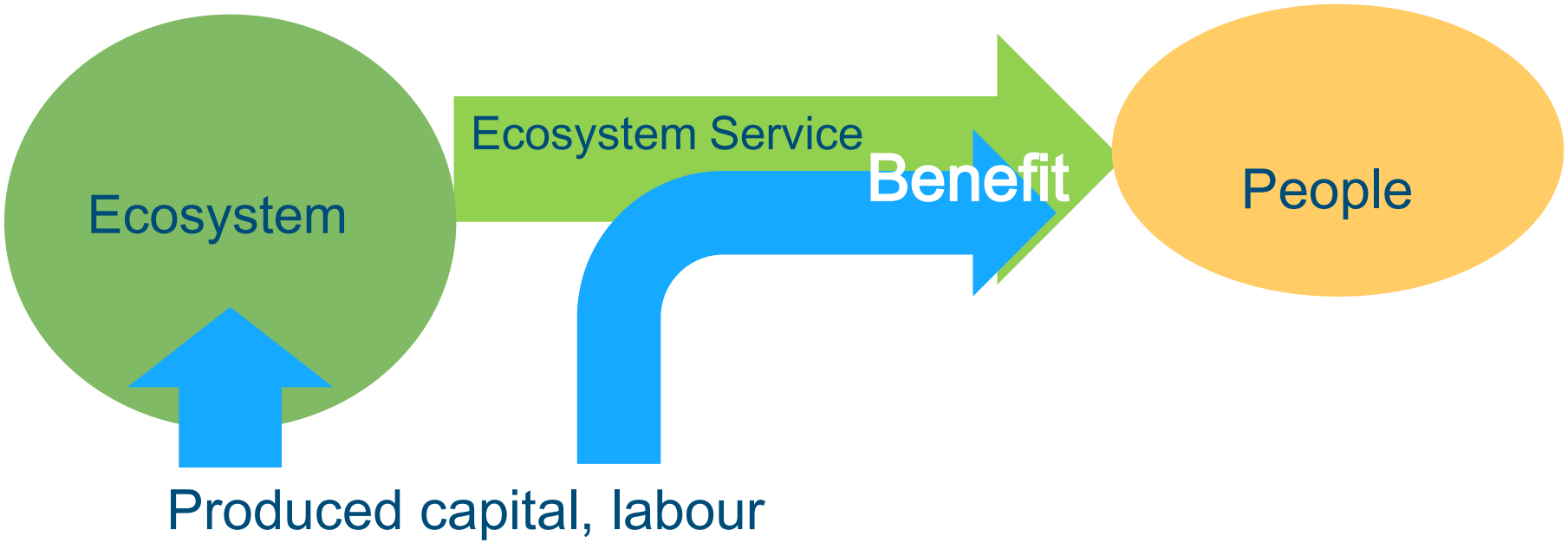
Contents

- Ecosystem services
- Conceptual framework
- Challenges in linking ecosystem services and air pollution
- Conclusions

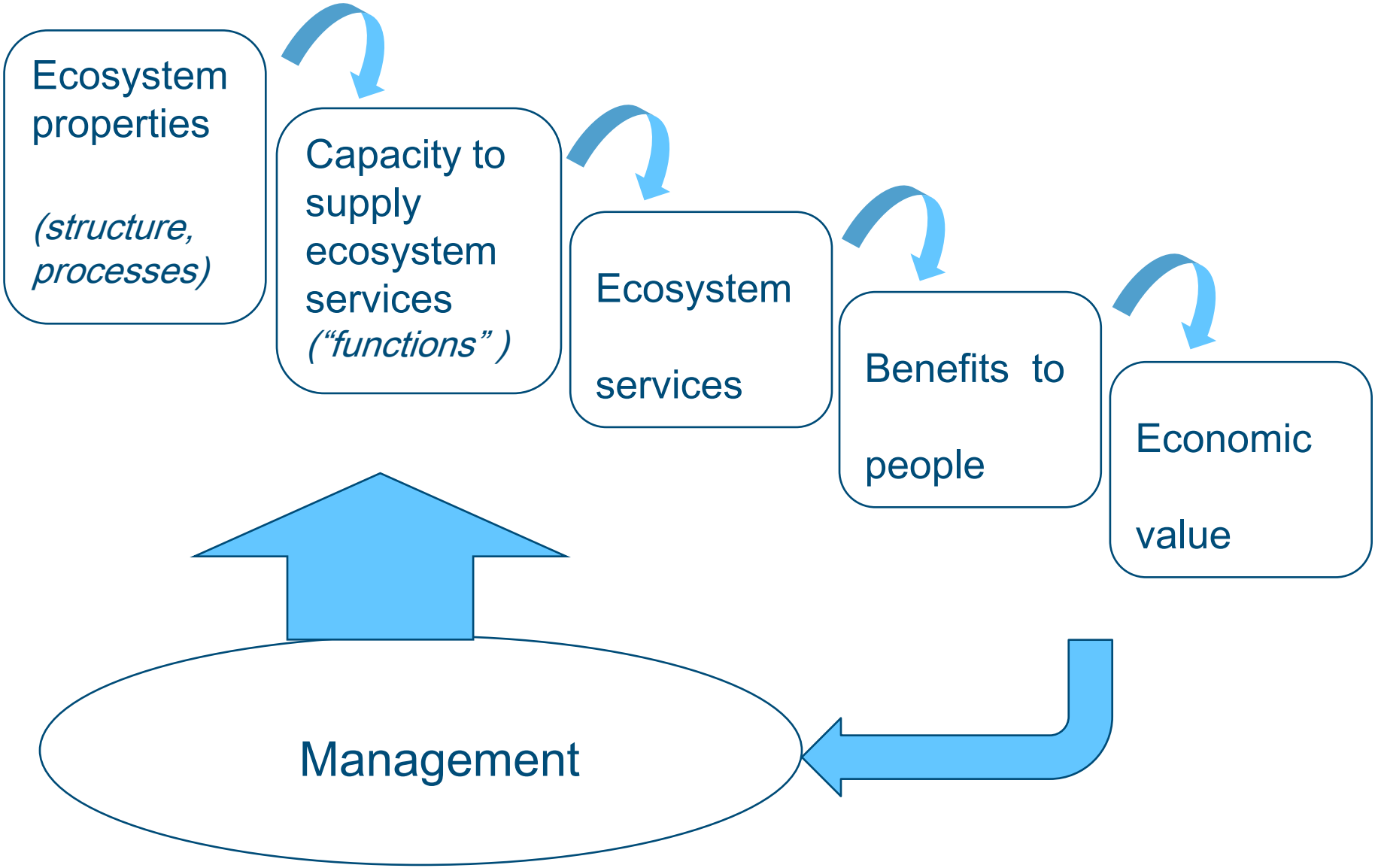
Not all slides that were presented are included, for more info see Schröter et al., 2014: Accounting for capacity and flow of ecosystem services: A conceptual model and a case study for Telemark, Norway. Ecological Indicators, 2014.

Ecosystem services

- Millennium Ecosystem Assessment (2005): Ecosystem Services are ‘the benefits provided by ecosystems (to people)’
- TEEB (2010): ‘the contributions of ecosystems to human benefits’

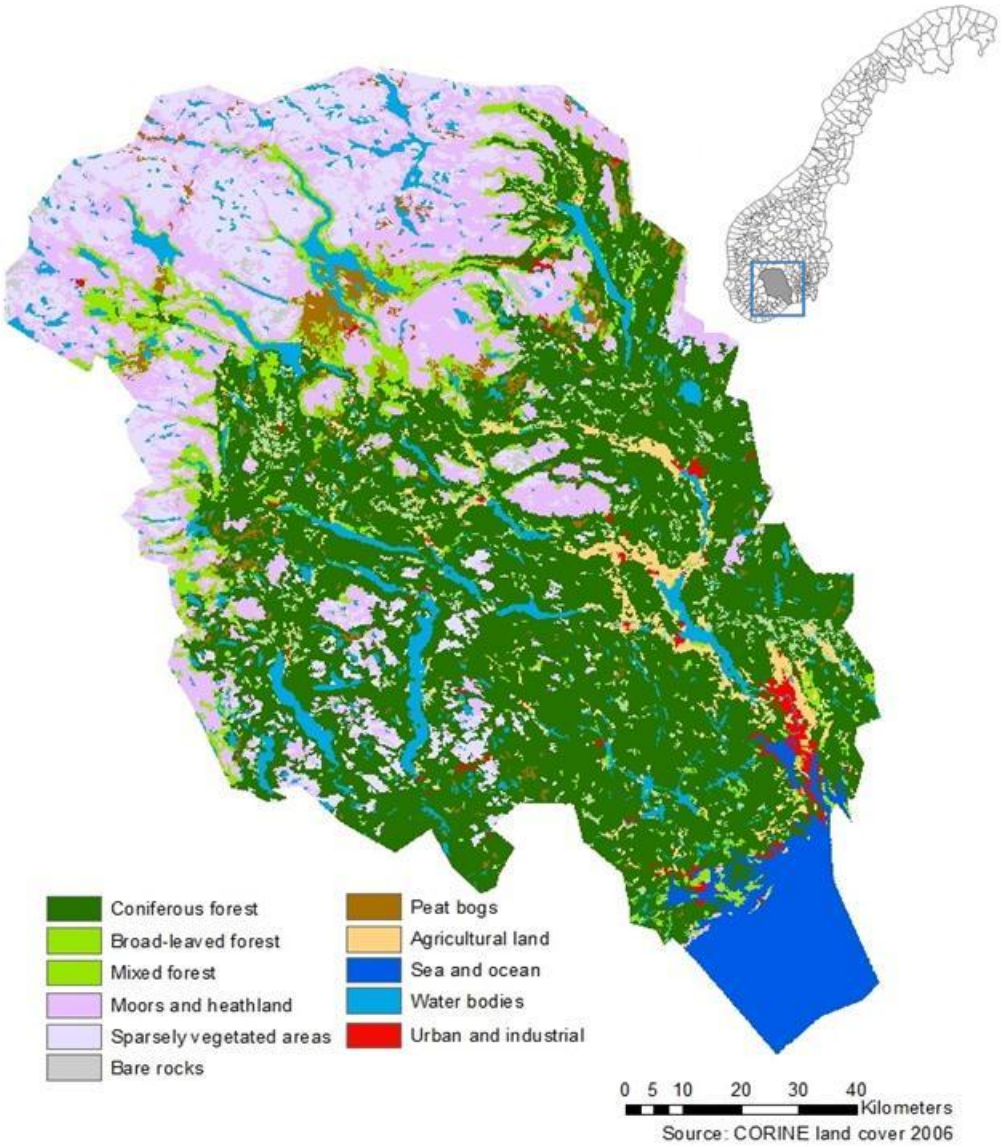


‘Cascade Diagram’



Adapted from Haines-Young and Potschin, 2010

Case 1. Telemark, Norway



Mountainous, semi-boreal, low population density

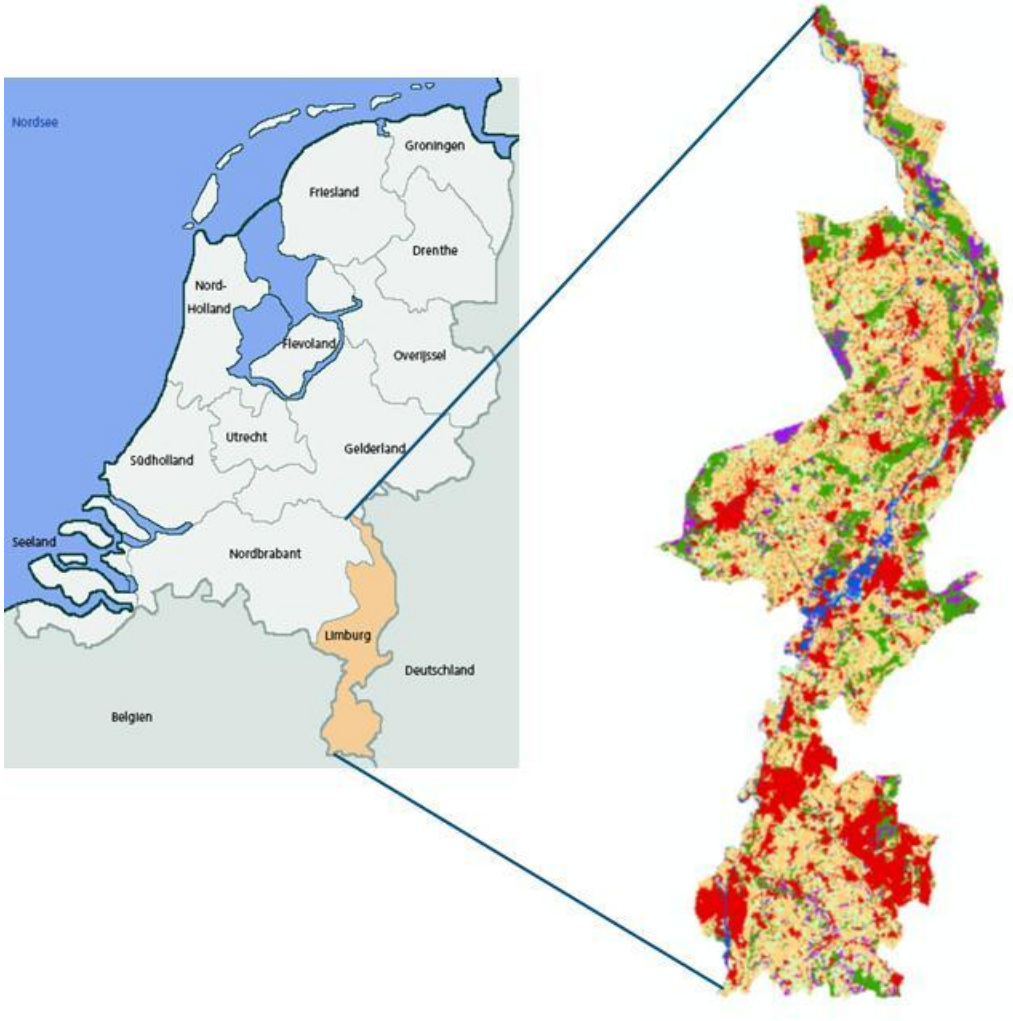
Modelled services (8) include:

- Forestry
- Hunting
- Reindeer herding
- Carbon storage and sequestration
- Tourism

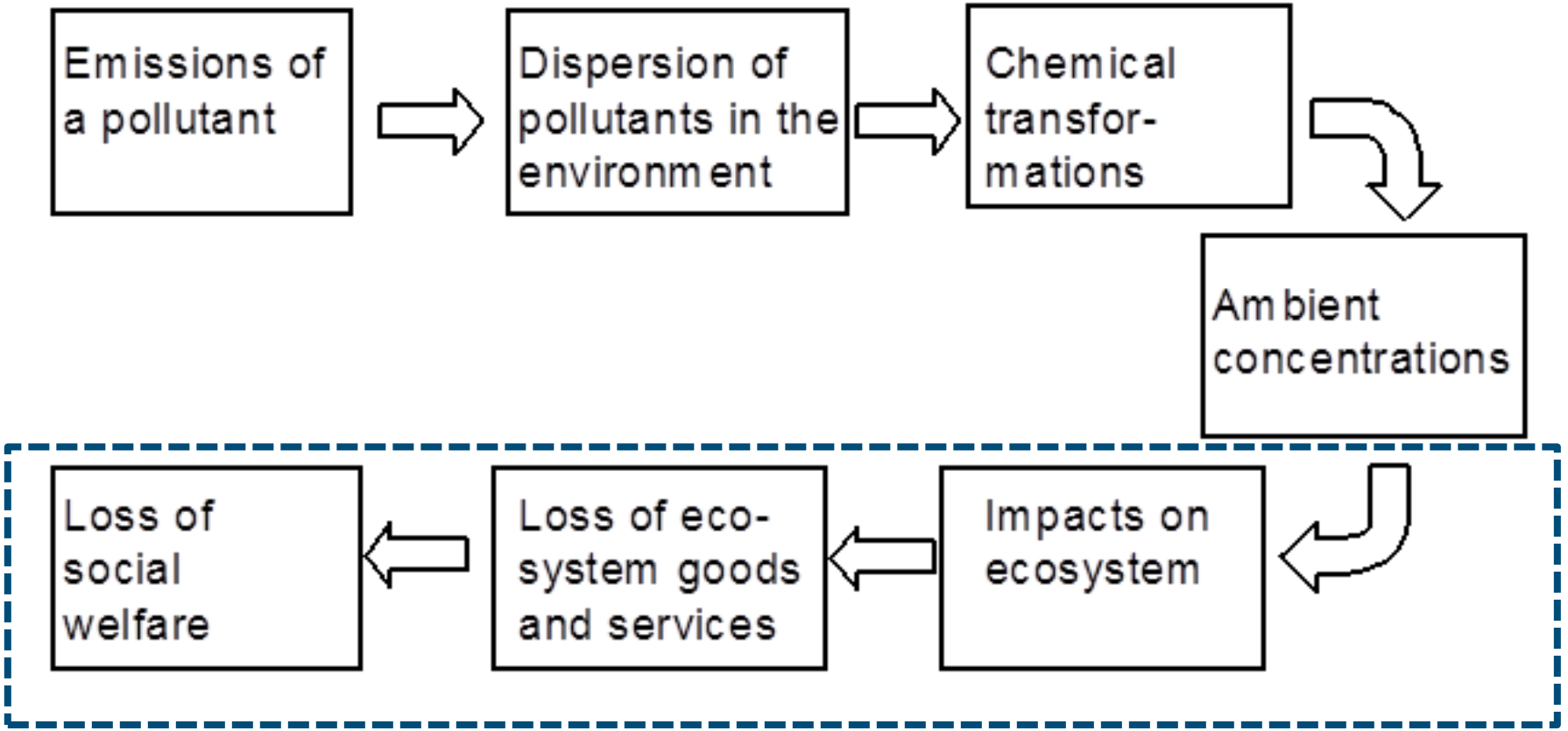
Specific aim: to test different methods to model services

Case 2. Limburg, Netherlands

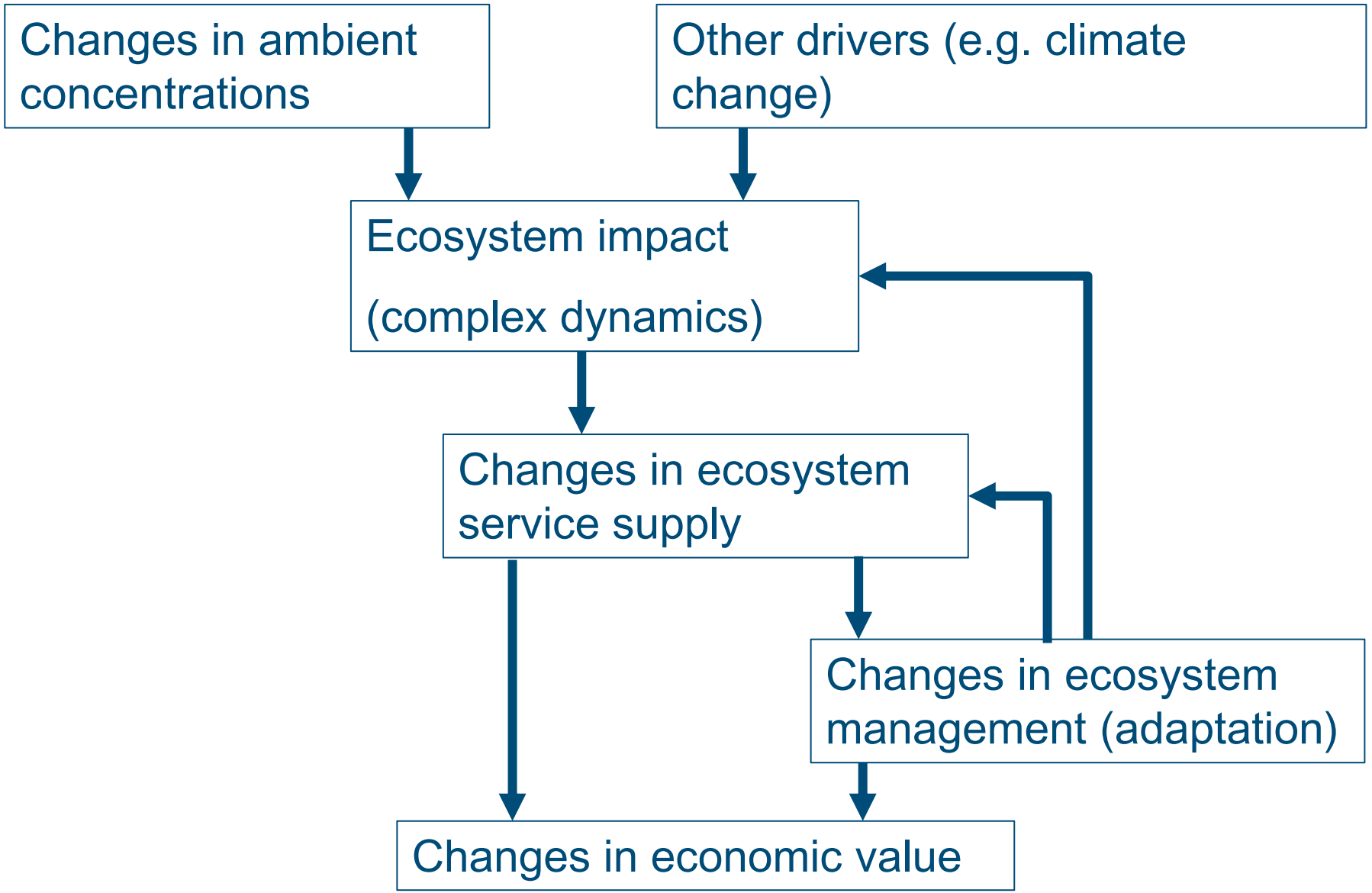
- Analyse ecosystem services flows and ecosystem capital
- 8 ecosystem services
- Specific attention for biodiversity
- Analyse two management options under two scenario's



Linking ES to Air Pollution

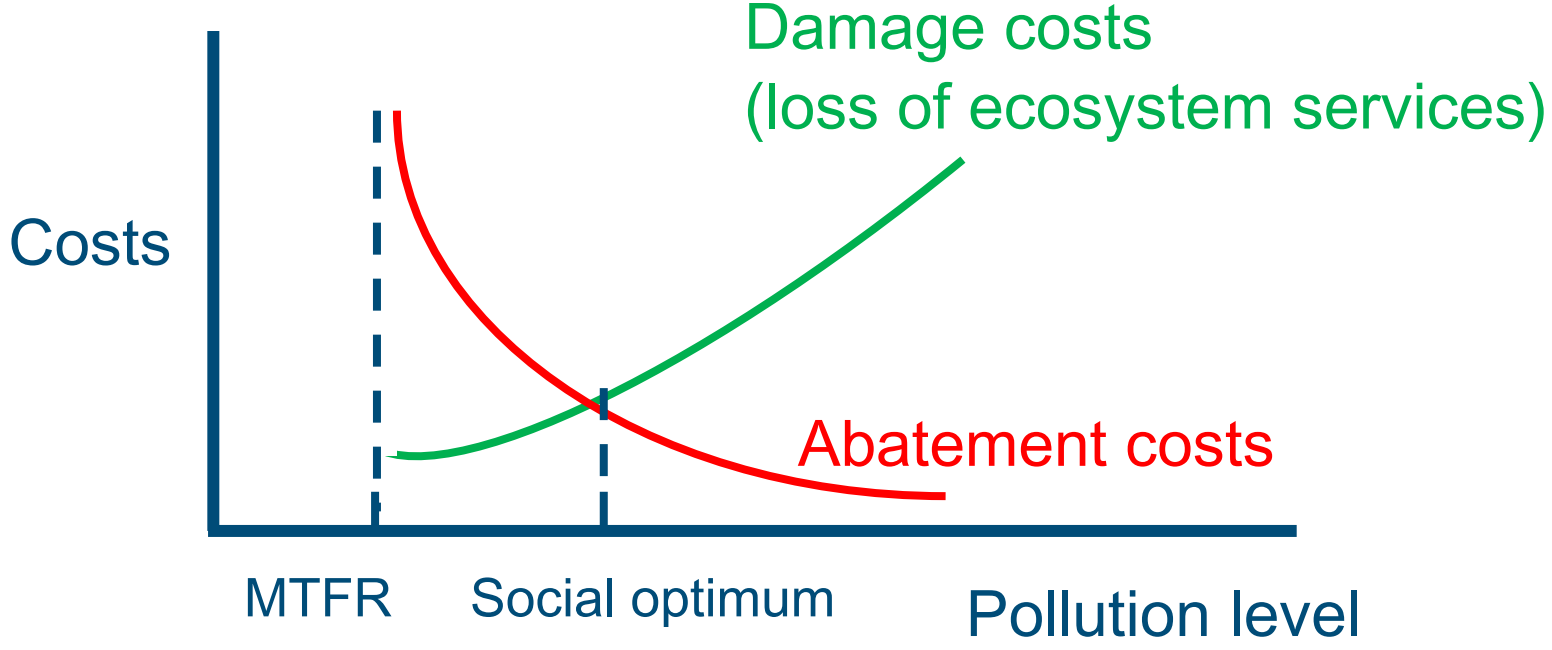


Conceptual framework



Comparing costs and benefits

Costs and benefits of acidification control



Challenges

- Linking pollution levels to ecosystem impacts / ecosystem functioning (dose-response)
- Linking ecosystem effects to losses (and gains) of ecosystem services (dose-response)
- Valuing changes in ecosystem service supply

Analysing effects on ecosystem services

- Spatial variability in ecosystem responses
- Spatial variability in ecosystems and the services they supply

Ecosystem	Number of Valuation studies	App. Range (2007 US$/ha/year)
Grasslands	25	500 – 1,500
Woodlands	18	20 – 2,000
Temperate Forest	40	40 – 6,000
Tropical Forest	140	100 – 12,000
Lakes	12	3,000 – 20,000
Inland wetland	86	1,000 – 70,000
Coastal wetland	112	3,000 – 300,000
Coastal system	32	300 – 90,000
Coral reefs	101	20 – 1,000,000
Open Ocean	6	20 - 100

Source: TEEB

Conclusions / points to consider (1)

- Need to deal with spatial variation: applicability of benefit transfer is limited;
- Value estimates published in the literature are of varying quality;
- Ecosystem changes may lead to both losses and gains of ecosystem services;
- Consider flows but also capacity

Conclusions / points to consider (2)

- Need to consider adaptation options;
- The relation between ecosystem change and capacity to supply ecosystem services will generally not be linear;
- Effects on biodiversity difficult to quantify (in physical as well as economic terms);
- Need for error and sensitivity analysis (!).