Valuation of ecosystem benefits

Workshop valuation of ecosystem benefits of air pollution abatement

Lieven De Smet, Arcadis Ecolas

Outline

- Ecosystem services
- How to assess changes in the quality and/or quantity of ecosystem services
- Improving decision making via the monetisation of ecosystem benefits
- TEV-framework
- Ecosystem services benefiting from air pollution abatement
- Decreased costs of nature management
- Valuation of ecosystem benefits – key questions

Ecosystem services

- Ecosystems contribute to human welfare via the provision of ecosystem services
- Ecosystem services are defined in the MEA as the benefits people derive from ecosystems
  - food, construction materials, ...
  - life-support services
  - recreational opportunities
  - non-use values
- Central question for policy making is “How do (policy) actions affect the quality and/or quantity of ecosystem services?”

How to assess changes in the quality and/or quantity of ecosystem services

- (1) Model the exposure of ecosystems
- (2) Assess the ecological responses (ecosystem effects) resulting from ecosystem exposure
- (3) Translate the ecological responses into the changes in the quality and/or quantity of ecosystem services

Improving decision making via the monetisation of ecosystem benefits

- Changes in the quality and/or quantity of ecosystem services = changes in welfare
- Monetised ecosystem benefits make the weighing exercise more straightforward
- Assess the likely welfare changes by using economic valuation techniques

TEV-framework

TEV	Use Values	Direct consumptive	Timber, food, ...
		Direct non-consumptive	Recreational fishing, aesthesis, ...
		Indirect non-consumptive	Flood control, pollution control, ...
		Option value	Conserve resources for future use
	Non-use values	Bequest value	Conserve for future generations because of moral reasons
		Existence value	Value of knowing something exists

Ecosystem services benefiting from air pollution abatement – acidification

Improved commercial freshwater fishing
Increased productivity of forests
Improvement of watersheds (e.g. water filtration, flood control)
Improved drinking water quality
Improved recreational amenities (e.g. forest aesthetics, nature study, recreational freshwater fishing, ...)
Increased option values, bequest values and existence values

Ecosystem services benefiting from air pollution abatement – eutrophication

Improved commercial fishing
Decreased productivity of forests
Improvement of watersheds (e.g. water filtration, flood control)
Improved recreational amenities (e.g. aesthetics, nature study, recreational fishing, ...)
Increased option values, bequest values and existence values

Ecosystem services benefiting from air pollution abatement – ground-level ozone

Increased commercial timber yields
Increased tons of carbon sequestered
Improved recreational amenities (e.g. aesthetics, nature study, ...)
Increased option values, bequest values and existence values

Decreased costs of nature management

- Decreased liming of freshwater ecosystems and soils
- Decreased need for turfing
- Decreased costs for drinking water treatment
- Reduction in travel costs?
- ...

Valuation of ecosystem benefits – key questions

- There is a need to identify and define the ecosystem services that are likely to be impacted by air pollution abatement initiatives.
  - Where to place changes in biodiversity?

- How to express the changes in the quantity and/or quality of the services ecosystems provide and the way these are impacted by air pollution?
  - Depending on the valuation method used
  - Standardized approach needed?
  - Per unit of surface as to facilitate the development of a handbook with authorised numbers?

Valuation of ecosystem benefits – key questions

- Is it desirable to estimate the value of the changes in all services separately or should ecosystem change be valuated as a whole?

- How to determine the relevant spatial scales of an original valuation study?

- How to account for the exact welfare changes in individual studies as the side conditions (ecosystem service provision) also changes?