

'Spearhead' Ecosystem and Landscape Services (SELS)

SELS is a long-term research programme aimed at developing knowledge about quantifying, evaluating and financing ecosystem and landscapes services and to implement this knowledge in integrated local planning, landscape design and management.

Problem statement

There is a growing interest in the science of ecosystem and landscape functions and services. However, this rarely takes a regional approach or is spatially explicit, and is still seldom used in decision-making for regional development. The difficulty to translate the effects of investments in development, conservation and management of semi-natural and rural landscapes into socio-cultural and economic costs and benefits is considered a major obstacle in achieving sustainable multi-functional use of the "green and blue" space.

Knowledge demand

There is a growing societal demand for better information on the benefits of landscape services and the necessity to invest in the maintenance and restoration of the associated ecosystem functions.

- In the report 'Right to Green' (2005), the Dutch Council for Rural Areas advised knowledge institutes to make the **social benefits of 'green quality'** transparent for politicians and other stakeholders, emphasizing the contribution to quality of life, health, local economy and biodiversity.
- The 'National Landscape' association has received concrete ambitions from the Dutch government to expand and improve the **Ecological Network**. As a result, there is a need to develop healthy business plans.
- The demand for knowledge about ecosystem services at the landscape level was also expressed during the Netherlands Environmental Assessment Agency (MNP) congress on **investing in the green quality of landscapes** (26 September 2006).
- The draft policy strategy of the interdepartmental policy programme to **adapt to climate change** (ARK) will be one of the pillars of the environmental policy of the new government. In this strategy (January 2007), ARK states that the ministries need a better understanding of the financial and economic instruments and mechanisms that will allow for improved inclusion of the long-term costs and benefits of climate adaptation strategies at various levels.
- Within the EU, ecosystem functions can be addressed during the **CAP HEALTH** check, in particular in relation to financing agri-environmental measures. At an international level, the Agreement to Protect the World's Forests is requesting voluntary global finance mechanisms.

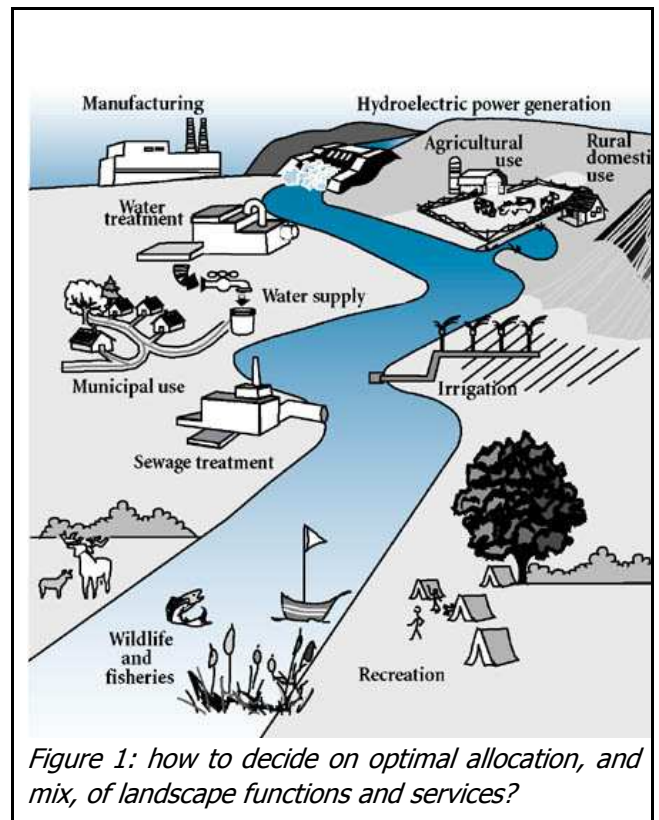


Figure 1: how to decide on optimal allocation, and mix, of landscape functions and services?

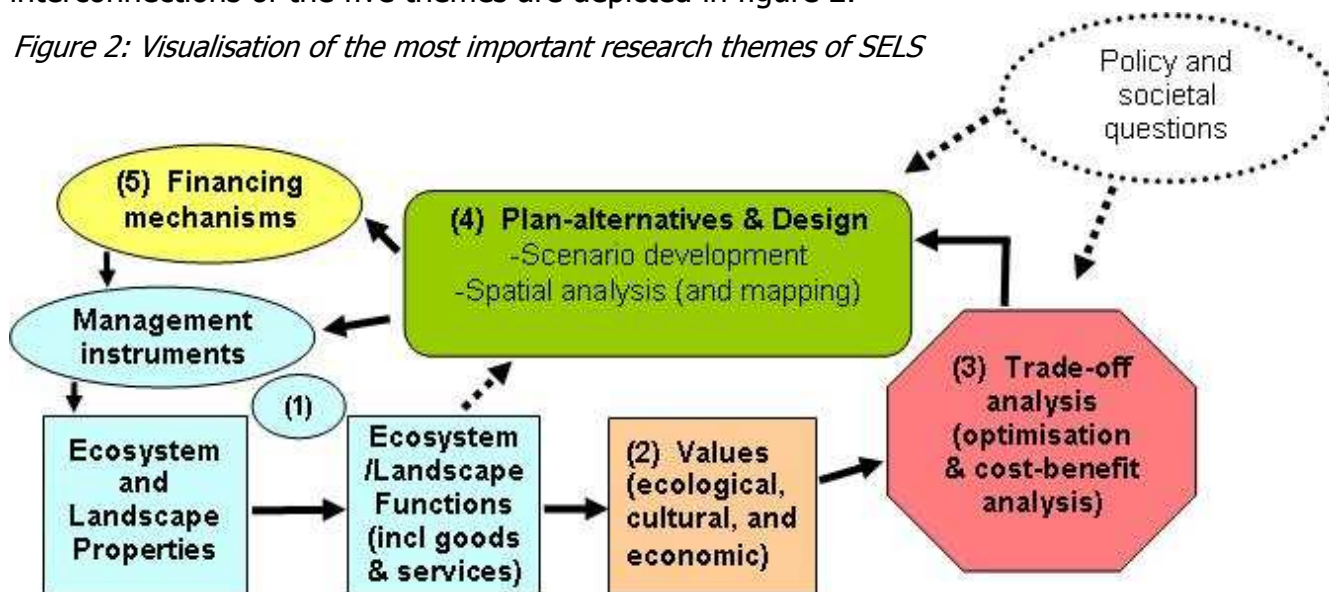
The Aim of this Research programme

The SELS research programme aims to "develop knowledge about quantifying, evaluating and financing ecosystem and landscape services, and the relationship between landscape functions, spatial characteristics and socio-cultural, ecological and economic values for planning, management and design of sustainable rural, semi-natural and natural environments".

SELS Research Themes & Projects

Five research themes have been formulated to achieve the above-mentioned objectives. The interconnections of the five themes are depicted in figure 2.

Figure 2: Visualisation of the most important research themes of SELS



Theme 1 - Identifying and Quantifying Ecosystem & Landscape Functions

Research objective: to quantify the relationship between physical and spatial landscape characteristics and the associated functions and services, and to analyze possible critical management thresholds.

Key research questions:

- How can relationships between landscape and ecosystem characteristics and their functions and associated goods and services be identified and quantified?
- What is the spatial distribution of E&L functions and how can they be mapped?
- What are possible critical thresholds for ecosystem resilience and sustainability?

- What is the effect of dynamic conditions (spatial and temporal) on services in terms of sustainability and resilience?
- How can interactions between E&L functions and services be modelled?
- How can the issue of resilience be applied to rural systems and landscapes?

Theme 2 - Values and Perceptions of Ecosystem and Landscape Services

Research objective: to quantify the importance (value) of ecosystem and landscape services and measure the added-value for people and the economy at different scale levels.

Key research questions:

- What are the most appropriate economic and social valuation methods for ecosystem and landscape services, including the role and perceptions of stakeholders?
- How to make economic and social valuation of landscape and ecosystem services consistent and comparable ?
- How can standardized indicators (e.g. as in the "Kentallenboek") help to determine the value of E&LS and how can aggregation steps be dealt with?

- How can the health benefits of nature/green space in an urban residential context be quantified and assessed ?
- How can values be captured "spatially" (eg. through mapping) to address scaling issues and facilitate the use of E&LS in (spatial) landscape planning and decision-making?
- What are the main bottlenecks in data availability and reliability and how can they be overcome?

Theme 3 - Ecosystem and Landscape Services in Trade-off Analysis and Decision making

Research objective: to develop evaluation methods of plan-alternatives for use of landscape functions and to optimize multi-functional use of the "green and blue space".

Key research questions:

- How can information on E&LS be better included in project evaluation methods (such as EIA, CBA and MCA)?
- How can the costs and benefits of changes in E&LS and values, in time and space, be taken into account, including discounting and cost-effectiveness issues?
- How can analytical and participatory methods be combined to enable effective participatory policy

and decision making dialogues ? [MCDA, RITA, ARIES]?

- How to select and involve stakeholders in trade-off analysis and what conditions make knowledge about E&LS applicable?
- How to communicate and visualise knowledge about ecosystem and landscape services and values, and the relevant uncertainties, to the various stakeholder groups?

Theme 4 - Ecosystem and Landscape Services in Planning, Management and Design

Research objective: to develop methods for landscape planning, design and management of 'green and blue space', taking the resilience and thresholds of landscape functions into account.

Key research questions:

- How can the concept of E&LS be applied to target setting, design and negotiation in spatial planning processes?
- What planning and design guidelines need to be developed for green spaces in new urban residential areas to take the health benefits provided by E&LS into account?
- How can spatial indicators and ecological

cartography be used as analytic tools within the spatial planning context?

- How can E&LS values be included in stakeholder based analysis and participatory decision making processes?
- How can the concept of E&LS be better communicated to the relevant users?

Theme 5 - Financing Instruments for Sustainable Use of Landscape/Ecosystem Services

Research objective: to identify and develop financing methods for investing in ecosystem and landscape services.

Key research questions:

- Which financing instruments and requirements are needed to attract public and private investments in green quality?
- What are the transaction costs? What costs should be included? Who should pay for these costs?
- How to involve beneficiaries into payments for ecosystem and landscape services?

- How to identify and quantify the costs and benefits of investments in E&LS, taking into account the distribution of these costs and benefits spatially and temporally, as well as among the various stakeholders?
- How to structurally promote the implementation of financing instruments (for example by bringing together the supply and demand of services)?

Pilot Case in the National Landscape "Groene Woud"

SELS seeks cooperation with the National Landscape "Groene Woud". This is a characteristic small-scale landscape between Tilburg, Eindhoven and Den Bosch that comprises of several brook valleys, forests, heathlands and rural estates, as well as historical agricultural land. The main challenge of stakeholders in this area is to combine economic development (recreation, housing and industries) with preservation of the landscape.

Researchers participating in SELS are encouraged to involve this National Landscape in (part of) their research to develop applicable knowledge for stakeholders and to provide added value to the individual projects within SELS.



Contact persons:
Carla Grashof and Joost Tersteeg

Key projects

Within these Themes, SELS finances (partly or completely) over 15 ongoing projects that are in various stages of progress. A selection of projects, with abbreviated titles, is briefly listed below.

For more details see www.ecosystems-services.nl.

Theme 1 <ul style="list-style-type: none">• Green landscape-elements for good air-quality• Services of multi-functional, constructed wetlands (Waterpark Het Lankheet)• Mapping bio-control as a landscape service	Theme 2 <ul style="list-style-type: none">• Aggregation of benefits of landscape improvement• Landscape perceptions i.r.t. multi-functional agriculture• "My Place to Be": data-bank with landscape preferences• GIS-based perception model• Benefits Natura 2000 network	Theme 3 <ul style="list-style-type: none">• Evaluating climate adaptation strategies (PhD-project)• Cost-benefit analysis of climate change• Evaluating trade-offs in multi-functional use of "green & blue" space (RITA-model)
Theme 4 <ul style="list-style-type: none">• Landscape services as a spatial planning concept (PhD-project)• Participatory Planning for Ecosystem services in green-blue networks.• Planning, valuation and financing of Ecosystem Service Restoration (PRESENCE)	Theme 5 <ul style="list-style-type: none">• Innovative financing mechanisms for Ecosystem services (PhD-project)• How do people want to pay?• Costing Nature Management• Private financing in practice: Rural European Platform• Marketing non-timber forest products and services	PhD projects: <i>SELS promotes PhD-trajectories that investigate aspects of the overall SELS research topic in more detail. Thus far, 3 PhD-projects have been formulated on the use of E&LS in trade-off analysis, integrated planning and sustainable financing instruments.</i>

Context

SELS is an initiative of the Knowledge Base program on "Sustainable development and adaptation of ecosystems and landscapes in a metropolitan context" (KB1, led by Prof. Paul Opdam (Alterra)) and the KB2 program on "Climate change" (led by Prof. Pier Vellinga/ Prof. Pavel Kabat).

The SELS program closely cooperates with the other two "spearheads" of these 'Knowledge Base programs' addressing 'Resilience' and 'Area Science', and with several related policy support research (BO) projects, e.g. the project on 'Financing mechanisms for ecosystem management'.

Organisation

SELS is coordinated by **Dr. Dolf de Groot** (dolf.degroot@wur.nl) of the Environmental Systems Analysis Group (ESA), and **Dr. Leon Braat** (leon.Braat@wur.nl), Alterra, supported by an Administrative Coordinator (Ir. Jeroen Veraart (Alterra)) and a Scientific Secretary (Jolande Termorshuizen MSc (Alterra)).

Development of a Knowledge Network and Outreach activities

- An inventory has been carried out of ongoing WUR research related to the topics addressed by SELS. In addition, a **website** (www.ecosystems-services.nl) has been created to stimulate information exchange among SELS researchers and facilitate collaboration with related researchers within and outside WUR.
- To facilitate interaction with related research outside WUR and to stay informed about national policy-developments, SELS participates in the **Nature Valuation & Financing Platform** (www.naturevaluation.org).