SSD

SCIENCE FOR A SUSTAINABLE DEVELOPMENT

BELGIUM'S ECOSYSTEM SERVICES

A VISION FOR SOCIETY–NATURE INTERACTIONS

BEES

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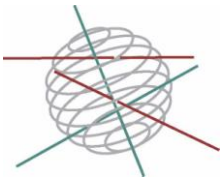

Cluster projects

FINAL REPORT

BELGIUM'S ECOSYSTEM SERVICES
A VISION FOR SOCIETY–NATURE INTERACTIONS

BEES

SD/CL/005

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1 Description of the BEES project

1.1 Ecosystem Services and their Valuation

Natural and semi-natural ecosystems and landscapes provide benefits to human society, which are of great ecological, socio-cultural and economic value (e.g. Costanza et al., 1997; de Groot et al., 2002). These benefits consist of a mix of goods and services, both private and public, provided by multi-functional landscapes, which, therefore, are sometimes referred to as our "natural capital". Ecosystem services are distinct from ecosystem functions, because there is human demand for these natural assets. Costanza et al. (1997) raised awareness on this by calculating the total contribution of ecosystem services to the global economy, which amounts up to ca. 33,000 billion US$ and is at least of the same order of magnitude of the entire global GDP (at 35,000 billion US$). Although these estimates were very coarse and caused some controversy, the insights from this publication stimulated a lot of research on this concept.

A major leap forward was the global Millennium Ecosystem Assessment (MEA) (2005). This work showed that the state of most ecosystems is deteriorating, as is the delivery of the majority of ES. Recently, Braat & ten Brink (2008) have estimated that, if the degradation of the ecosystems continues at the present pace, the growth of the global economy will come to a standstill, because the ecosystem goods and services presently provided for free will need to be provisioned by other, human-initiated and technical operations that will undoubtedly be more costly or arrive at fossil fuel limits. The economic valuation of ecosystem services clearly presents a promising tool to highlight the relevance to society and the economy of ecosystem services, and to serve as an element in policy development (CBD, 2007). Such a valuation, however, involves complex issues including the understanding of ecological as wel as socio-economic mechanisms leading to the delivery of ES.

In Belgium, very few attempts to evaluate ecosystem services in financial or other terms have been conducted so far. In 2006, a conference "The Millennium Ecosystem Assessment: Implications for Belgium" (Bourdeau & Zaccaï, 2007) was organized, followed by a workshop in 2008 "Ecosystems Services Seminar". Considering the importance of ecosystem services to the Belgian economy and to human well-being, it only appears logical to introduce these services in economic considerations, in order to take them into account in relevant policies. It is moreover urgent to do so before their decline results in an explosion of costs. To develop an adequate scientific basis for such a study, a targeted effort is needed to promote focused research contributing to both science policy as well as environmental policy (e.g., polluter pays principle, management of natural resource conflicts, development of water management schemes, environmental damage liability, etc.). The present proposal aims to deliver an overview of the issues at stake, from environmental, methodological economic to sociological, and to advice on priority research and policy actions needed to come to a policy-relevant strategy for ecosystem services in Belgium.

1.2 Interlinked emerging issues: adaptation and climate change

Notwithstanding high investments in the reduction of greenhouse gas emissions, climate change is likely to affect natural and human system in a profound way. Therefore, adaptation to the effects, including reduction of the negative impacts, of climate change will be of utmost importance. The scale of change that needs to be addressed is daunting in several aspects: effects of climate change

will range from local to global, and will occur at an unprecedented pace. These challenges are such that the "command and control" paradigm of the 60's, when one believed that all environmental problems could be solved by infrastructure and technology, can no longer be continued. Adaptation will require a fundamental change in the way we see and manage our environment. Increasing the resilience of the ecosystems exposed to environment perturbations will become a crucial strategy to reduce the negative impacts of climate change. This is because investing in the natural capital to increase ecosystem services not only reduces the effects of climate change (e.g., flooding, retention of water in periods of drought) but also to combat its causes (e.g., carbon capture and sequestration) in a cost-effective way.

1.3 Accomplishments of the BEES cluster

It is our profound belief that advances on ES research cannot only depend on large-scale initiatives and a top-down knowledge transfer. Like ecosystem services, there are scaling issues involved. The ecosystems in our region might differ from those in other regions, both in terms of ecological aspects as from a socio-economical viewpoint. To put Belgian research on ecosystem services on the international map, there is a need to structure and focus the research initiatives within the Belgian context. Our cluster initiative succeeded to:

- Bring together key scientists, policy makers and organizations that are either already involved with ES-research or who might catalyze the ES-research.
- Make an inventory on the ES expertise (a "who's doing what").
- Describe a state of the art of ecosystem service related research in Belgium and to bring forward a methodology that could be used as a basis for an ecosystem assessment of Belgium.
- Establish a "virtual" research institute on ES research in Belgium, covering the necessary expertise to contribute to large international research initiatives.
- Formulate recommendations for scientific programs and policy objectives.

2 About the BEES partners

The cluster brought together several key players in the field, covering both academics and institutions, and natural and social sciences. As it was impossible to include all relevant partners in the proposal several workshops were organized (see below) to reach as much relevant actors as possible. In this way, the cluster has stimulated the dialogue and exchange of ideas between scientists of social sciences (economist, sociologists, lawyers) and natural sciences (ecologists, environmentalists, agronomists), civil servants, environmental NGOs, international organizations and the private sector. It has helped Belgian scientists to become internationally acknowledged in this research field and to prepare European research projects. As leading international scientists were be invited to the workshops, opportunities for Belgian researchers to discuss ideas and propose common research projects were created.

Finally, as this cluster was strongly linked to the ES-dedicated research projects granted under call 5 of SSD, a new vision on a truly integrated approach of the concept of ecosystem services and the possibilities to incorporate this concept in policy and management was developed.

3 Methodology and Approach

While actively incorporating all relevant partners within this cluster project is impossible, it is crucial to get a close cooperation between the partners of the cluster and many other research groups and institutions to get to the relevant information. Many different techniques exist to bring together relevant information, among them, interviews, workshops, questionnaires etc. However, as all key players have very busy agenda's and are under a heavy competitive pressure, these methods not always provide the required cooperation. We have attempted to increase active participation by providing a return for the delivered input.

This project consisted mainly of workshops, and each workshop was linked to a work package (WP). For each workshop all relevant people were invited to participate. The workshops were held in English and key researcher, internationally renowned in the workshop topic, will be invited to give a key note speech The format of the workshop (presentations, debate, brainstorming sessions) can vary and this depends on the objectives of the respective WP's. Details of each WP are given below, here we describe the overall approach, timing and the interrelationships between the different WP's. After the workshop, the coordinator has drafted a text summarizing the workshop as a chapter for the BEES book publication. This chapter was distributed to all participants who contributed to the workshop . As was very likely, the workshops have led to more intense bilateral communications with experts from outside the project consortium, and the final BEES book publications contains several significant contributions from projects and partners outside the original consortium. The broadened informal network is now called the BEEScommunity, and this open community is playing a proactive role in debate, research and practice concerning Ecosystem Services on a Belgian scale

At the start of the project a partner meeting was organized to discuss all the workflow of the project and to make the necessary agreements. WP1 (Data base analysis) started immediately from the beginning and was finalized after 4 months. In between each WP, a review on the state of the art was made and the relevant questions were formulated. This was the "preparatory phase" (fig. 1). During partner meetings, the results were evaluated and necessary arrangements for the workshops made. Phase 2 consisted of the different workshops which were organized over a period of about one and a half year, starting after 5 months. The order of the different topics (WPs) was deemed important, concerning knowledge transfer from one to another WP. However, at the final phase, it was clear that knowledge transfer in different direction is necessary, and the extra time needed to realize this is well spent. Partner meetings were held to evaluate the workshops and plan the next phase. The final phase, taking the last 6 months of the study, was originally dedicated to the writing of the final cluster report. However, the ambition level of the project increased significantly, and together with BELSPO, the choice was made to put most of the energy of this final phase in the organization of a high-level conference (see further), and the preparation of a book publication to disseminate the results in a professional and academic manner.

This report compiles the workshop reports, the final conference's conclusions, and introduces the main results of the project, being the emergence of an active BEEScommunity, linked to all national and relevant international players in the ES field (TEEB, ESP, ES-CoP NL, MAES), as well as a preview on the developing book publication.

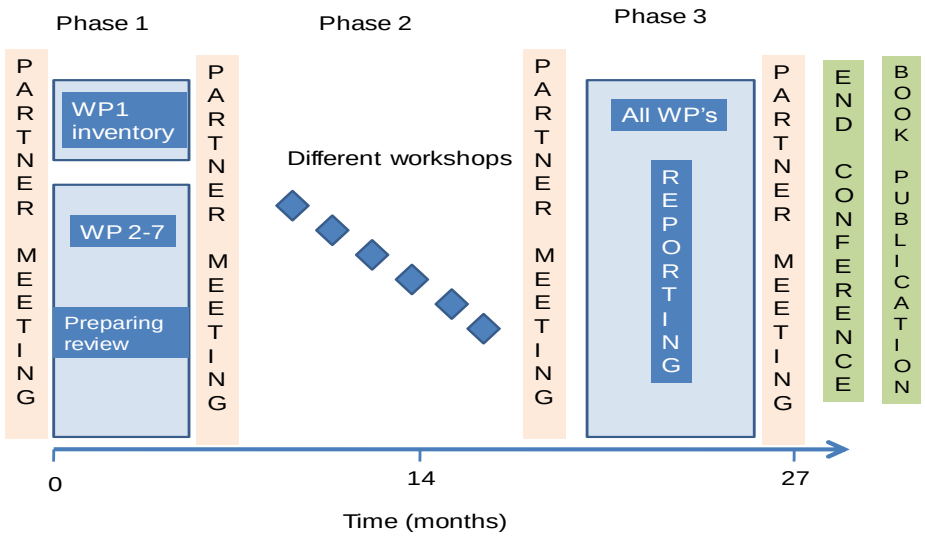


Figure 1: Overview of the different phases of the project and the approximate timing.

The project started with the analysis of the Biobel database (WP1). This resulted in an overview of the relevant actors in the field served as input to all other WP's, so that each coordinator was sure to invite relevant actors for the workshops. The workshops follow a logical track whereby each workshop has an input the following ones.

4 Summary overview of Working Packages Results

4.1 WP1 Inventory of existing knowledge (coordinator KBIN)

To permit performing comprehensive assessment and valuation studies of ecosystem services in Belgium, the necessary research capacity has to be available. This includes existing capacity as well dedicated and appropriate science policy instruments, such as research funding programs.
WP1 obtained an overview of research expertise related to ecosystem services, and of the effectiveness of research programs from which Belgian researchers benefit to acquire the necessary resources to conduct assessment and valuation studies. this objective was reached by reviewing available expertise and knowledge gaps related to ecosystem services in Belgium, by analyzing the information on research projects and programs included in the BioBel database, updated through an intensive round of interviews with key experts in Belgian research institutes or laboratories. The BioBel database is a comprehensive, continuously updated source of information on biodiversity research resources (persons, institutes, projects), managed by the Belgian Biodiversity Platform (see http://biobel.biodiversity.be).
Based on this evaluation, recommendations on research strategies for ES-research will be formulated. These findings were presented on the final TEEBelgium symposium, and in an introductory chapter in the BEESbook.

4.2 WP2: Inventory and prioritisation of ES in Belgium (Coordinator INBO)

Of the globally recognized ecosystem services, some are of particular relevance to present and future Belgium society and economy. A prioritization exercise for Belgium would be very necessary for defining, orientating and evaluating the current and future actions of policy makers and concerned stakeholders at different levels. In order to tackle this issue, we have to start from a sound classification system and conceptual framework. The Millennium Ecosystem Assessment (MEA, 2005) provided an international-recognized standard, which defined several frameworks and 4 major categories of ES. This system has further been improved by Fisher et al. (2009), who formulated an improved operational definition and classification scheme. They define ES as "the aspects of ecosystems utilized (actively or passively) to produce human well-being". This means that they make a clear distinction between intermediary and final ES, and that ES include ecosystem organization or structure as well as process and/or functions that are not utilized directly. The review of ES indicators was be based on Layke (2009). This WP provided an inventory and prioritization of the most important ES in Belgium. The key network for this WP included most of the environmental reporting agencies of Belgium (such as INBO, DEMNA, VMM, DLV, IBGE-BIM, VLIZ, CDK). This was complemented with all stakeholders involved in the application of ES in Belgium. The findings were presented on the final TEEBelgium symposium, and elaborated in two chapters in the BEESbook.

4.3 WP 3 ES methodologies, scales and interactions (Coordination ECOBE)

Every scientific study on ecosystems is confronted with the difficult choice of relevant scale. Dealing with the heterogeneity and variability of ES is a huge challenge. Ecosystem services can be mapped and/or calculated and valued at different scales. ES procure from multiple and complex interactions and processes that take place within and between ecosystems. The interdependence of both direct and indirect ES puzzles many scientists. Knowledge on spatial and temporal dynamics is crucial to understanding trade-offs between ES. Upscaling and aggregation of ES is only possible when considering the appropriate spatial and temporal scales. What are the most suitable research levels scales, mapping units, indicators and monitoring methods to identify and evaluate ES in Belgium using the state of the art science but acknowledging inherent (remaining) uncertainty?
The study summarizes the workshop conclusions and formulates clear recommendations on dealing with spatial and temporal scales, uncertainty and data gaps to be considered in ecosystem services studies and provides recommendations on the methodology for mapping ES. These findings and recommendations were presented on the TEEBelgium conderence, elaborated in a chapter of the book, and in contributions to several other BEESbook chapters.

4.4 WP 4 Biodiversity and ecosystem services (Coordination: KULeuven)

The concept of biodiversity takes an essential place in the study of ecosystem services. Biodiversity is the supporting service of finally all services and wellbeing on earth. Although this is an evident observation, the valuation of this 'service' is difficult as the total value of biodiversity is 'intangible' or 'invaluable'. However, the mechanisms behind this support can clarify its total value and contribution to human well-being. Both the portfolio effect (e.g., primary productivity, biogeochemical conversion processes, nutrient retention; Loreau et al. 2002, Cardinale et al. 2007) as the insurance function sustain and stabilize ecosystem services in the face of environmental changes, ecosystem disturbances (Kremen 2005), spread of disease (Ostfeld and Keesing 2000) or the arrival of invasive species (Mwangi et al. 2007).
This WP reviewed how and to what extent biodiversity contributed to the delivery of services by ecosystems, and whether this contribution can be valued socially or quantified economically. This aspect was discussed on the final TEEBelgium conference as well as in an introductory and elaborated chapter in the BEESbook.

4.5 WP 5 Valuation methods (Coordination: VITO)

The monetary valuation of ecosystem services aims to capture the welfare gains that members of society (e.g. Belgium) get from these goods and services. The underlying case for the valuation of ecosystem services is that it will contribute towards better decision-making. (Defra, 2007). To be able to do this it is important to make the bridge between physical changes of the ecosystem and the effect on the ecosystem services in order to quantify services or at least give proxies or indicators for changes in services. These quantities can then be multiplied by the right values. A set of valuation

techniques has been used to estimate market as well as non-market values of environmental goods. These techniques have been applied convincingly to many components of biodiversity and ecosystem services. To be able to make an ecosystem services assessment for Belgium it is very important that valuation of ecosystem services is being done on the basis of a common framework. This workpackage discussed on the valuation of ES, monetary as well as non-monetary, and debated on the complementary use of different approaches. Fueled by discussions on the workshop and the final TEEBelgium conference, several essential contributions to the BEESbook were made by partners within and outside the consortium, adding to development of a clear vision on valuation of ecosystem services.

4.6 WP 6 Impact of international trade on ecosystem services (Coordination: RHEA)

A wide range of ecosystem services that benefit Belgian society originate from distant ecosystems, including tropical ecosystems. This holds for provisioning services as well as regulating, supporting, and cultural services. The extraction of, mostly, provisioning services and the alteration of ecosystems in favour of these selected services has a profound impact on source ecosystems, to the extent that some other services are progressively being destroyed. At the opposite, export of ecosystem services generated by Belgian habitats and/or alteration of Belgian ecosystems in support thereof also occurs. At the global scale, agriculture and fisheries are the major drivers causing change in ecosystems and the services they render. Neither Belgian consumers nor decision makers are well-informed about these impacts, that moreover often threaten the livelihoods of local people. Within this work package imported services whose generation (production) or extraction impacts on distant ecosystems were identified, focusing on those that pose the greatest threat, and/or those that generate the most commercial activities. Policy recommendations to reduce the impact of these imports on the source ecosystems were developed. Also, case studies corresponding to different sectors, managed resources and/or geographical zones were analyzed.

4.7 WP7 - Linking ES to policy instruments (Coordinators: ULB – INBO)

While there has been a recent markedly increase in research on ES (including their (e)valuation), considerably less attention has been devoted to clarify the integration of the concept of ES with ecosystem management, and more particularly with the design, implementation and evaluation of policies (Brooks et al 2002, Cowley et al. 2008, Doussan 2009). WP 7 started from the stock of current research on these linkages, and provided the opportunity to advance the debate between science and policy actors on the integration of the concept of ES into policy making by focusing on the implementation phase of policies, i.e. by focusing on policy instruments. WP7 was built on the specific knowledge produced in WP2 to WP6, which was complemented and specified with existing international scientific knowledge, and elaborated on the translation of these strands of ES-knowledge into the policy-science interface.WP7 established bi-directional lessons: a) how ES practice could be configured in order to facilitate the uptake of the concept and (e)valuation of ES into policy instruments' design; b) how policy instrumentation should be adapted in order to receive

and use ES (e)valuation. Additional issues were addressed such as: what are the specific needs that existing or forthcoming policy instruments, including regional, national and European, will raise to the evaluation and valuation of ES? how to adapt and operationalize the ES concept, and particularly the (Belgian) science practice on ES, towards a better adequacy with the needs occurring during the configuration and evaluation of policy instruments?
These issues were addressed during the TEEBelgium final conference, is several contributions in the BEESbook as well as in ongoing debates within the BEEScommunity.

5 Results and Products

The main result of the BEES cluster project is the development of an active community of practice on Ecosystem Service research and practice, including researchers from different disciplines, but also policy makers, practicioners, civil servants from different administrations and people from the business community. It is difficult to quantitatively measure the success of this accomplishment. The final conference TEEBelgium was an important effort in mainstreaming the ES concept across sectors in Belgium, as well as in putting Belgian research on the international map of 'TEEB-like' initiatives. The BEESbook, which is in its final stage of development (publisher negotiations and external reviewing process) wil provide a reference work for ecosystem service debates in an interdisciplinary context, and reaching beyond the strictly Belgian case.

5.1 The workshops

The number of unique participants during the workshops has risen up till the very last workshop, indicating that a broadening public of participants was joined. (fig…), and suggesting that a continuing effort in a BEEScommunity might be fruitful.

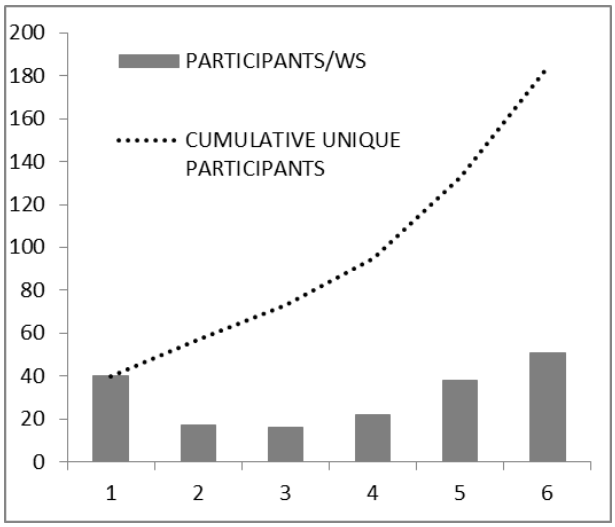


Figure … total number of (unique) participants (dotted line) and participant number per workshop (bars) for the workshops of WP 2-7 (WP1 was an inventory and interview round without a workshop)

Participants from 22 university groups, 8 research institutions, 25 public administrations and several consultants and NGO's have actively joined the workshops. The basic results of the work packages are summarized in general above. The products from the work packages consisted of discussion texts, presentations and final reports where debates, literature reviews, workshop presentations and participant input were integrated. These documents can be found on http://www.biodiversity.be/bees/static/show/12. The large amount of information and expertise collected and generated throughout the cluster project cannot be reproduced in this report. In the BEESbook, the findings of the project workshop discussions, literature reviews and debates within the BEEScommunity will be presented in accessible but chapters, co-authored and peer reviewed by both national and international experts.

In this section, the workshop overview of presentations and reports is provided. Full presentations and discussion notes are found on the BEES website. It should be noted that these discussion notes,

despite providing a good literature and knowledge base, have strongly evolved during the course of the workshops and represent a timely snapshot of the state of the art. These have to be considered as working documents towards the publication of the BEESbook

5.1.1 WP2 BEES WORKSHOP 26 NOVEMBER 2010 – BRUSSELS

"Framework, classification and indicators for ecosystem services in Belgium"
Challenges for classifying ecosystem services in a Belgian context
http://www.biodiversity.be/958

- The ecosystem services concept in policy support
  Rob Alkemade http://www.biodiversity.be/files/1/3/2/1326.pdf
- Ecosystem Services Forum at the Belgian Biodiversity Platform
  Hans Keune http://www.biodiversity.be/files/9/6/2/962.pdf
- Ecosystem services indicators for Belgium - Measuring what you manage? Proposals and prospects regarding ecosystem service indicators
  Wouter Van Reeth http://www.biodiversity.be/files/9/6/1/961.pdf
- Ecosystem services classification for Belgium - Challenges for classifying ecosystem services in a Belgian context
  Francis Turkelboom http://www.biodiversity.be/files/9/6/0/960.pdf
- **Discussion report** http://www.biodiversity.be/files/1/3/2/1325.pdf

5.1.2 WP3 BEES WORKSHOP 23 MARCH 2011 – LEUVEN

"The scaling problem, uncertainty, science and pragmatism"
http://www.biodiversity.be/1106

- Introduction to the scaling problem.
  Sander Jacobs http://www.biodiversity.be/files/1/1/0/1109.pdf
- Modelling Ecosystem Services Flows from Nature to Humans
  Ferdinando Villa
- Scale effects within ecosystems Case study: Pond complex Midden-Limburg
  Tom De Bie http://www.biodiversity.be/files/1/1/0/1107.pdf
- Scale effects of ecosystem services within catchments
  Katrien Van Der Biest http://www.biodiversity.be/files/1/1/1/1111.pdf
- VOTING for the right scale in biophysical valuation of ecosystem services
  Louis François http://www.biodiversity.be/files/1/1/1/1112.pdf
- Implementing RS potential into ecosystem functional mapping: exploiting the spatially explicit and multi-scale potential
  Birgen Haest http://www.biodiversity.be/files/1/1/1/1115.pdf
- Spatial scales in economic valuation
  Inge Liekens http://www.biodiversity.be/files/1/1/0/1108.pdf
- Scale issues in Social Assessment of Ecosystem Services - Who VOTES?
  Rik De Vreese http://www.biodiversity.be/files/1/1/1/1113.pdf
- Towards an integrated management approach?
  Jan Staes http://www.biodiversity.be/files/1/1/1/1110.pdf

5.1.3 WP4 BEES WORKSHOP 24 MARCH 2011 – LEUVEN

"Biodiversity and Ecosystem Services"
http://www.biodiversity.be/1116

- The Economic Value of Biodiversity: the Essential Role of Ecosystem Services.
  Leon Braat http://www.biodiversity.be/files/1/1/1/1119.pdf
- Synergies between ecosystem services, biodiversity and conservation efforts in Europe
  Joachim Maes http://www.biodiversity.be/files/1/1/2/1120.pdf
- Biodiversity and economic valuation: what is happening and what are the challenges? **Inge Liekens** http://www.biodiversity.be/files/1/1/2/1121.pdf
- No Data, No problems? A guided tour into the world of biodiversity and environmental information initiatives.
  Hendrik Segers http://www.biodiversity.be/files/1/1/2/1122.pdf
- Towards an improved framework for ecosystems assessment - Indicating Biodiversity and Ecosystem Services.
  Christian K. Feld http://www.biodiversity.be/files/1/1/2/1124.pdf
- Biodiversity and ecosystem services: complementary visions on natural capital?
  Anik Schneiders http://www.biodiversity.be/files/1/1/2/1125.pdf
- Ecological mechanisms underlying the link between biodiversity and ES.
  Luc De Meester http://www.biodiversity.be/files/1/1/1/1118.pdf
- Integrated long-term monitoring program of an estuarine ecosystem: the case of the Schelde estuary. What does it learn to estimate the impact of climate change?
  Patrick Meire http://www.biodiversity.be/files/1/1/1/1117.pdf
- Can we conserve biodiversity and optimise ecosystem services at the same time? **Francis Turkelboom** http://www.biodiversity.be/files/1/1/2/1123.pdf

5.1.4 WP5 BEES WORKSHOP 18 MAY 2011 – ANTWERP

"Valuation methods"
http://www.biodiversity.be/1078

- Introduction http://www.biodiversity.be/files/1/1/7/1173.pdf
- Challenges in the economic valuation of ecosystem services
  Anil markandya http://www.biodiversity.be/files/1/1/7/1172.pdf
- Interactive sessions with short presentation(s)
  - Session I: What are we valuing?
    Inge Liekens http://www.biodiversity.be/files/1/1/7/1171.pdf
    Sander Jacobs http://www.biodiversity.be/files/1/1/7/1170.pdf
  - SessionII: Aggregating and upscaling ES
    Challenges in benefit transfer and aggregation
    Leo De Nocker http://www.biodiversity.be/files/1/1/6/1169.pdf
  - SessionIII: Use in policy: assumptions and uncertainty
    Economic Valuation of Ecosystem Services in Policy Decisions
    Tanya Cerulus http://www.biodiversity.be/files/1/1/6/1168.pdf
    Economic Valuation of Ecosystem Services: "The Price is Right" or "Wheel of Fortune"? **Wouter Van Reeth** http://www.biodiversity.be/files/1/1/6/1167.pdf

5.1.5 WP6 BEES WORKSHOP OCTOBER 2011 – BRUSSELS

Impact of international trade on ecosystem services

- International trade, biodiversity and ecosystems.
  Alain Peeters http://www.biodiversity.be/files/1/2/4/1241.pdf
- Commercial farming and ES in the Philippines.
  Nicolas Dendoncker http://www.biodiversity.be/files/1/2/3/1237.pdf
- Logging impacts in Central African moist forests.
  Jean-Louis Doucet http://www.biodiversity.be/files/1/2/4/1242.pdf
- Deforestation, oil palm plantations and biodiversity in Malaysia.
  Pierre Devillers & Roseline Beudels http://www.biodiversity.be/files/1/2/4/1243.pdf
- Livestock feed imports and ES.
  Sander Jacobs & Alain Peeters http://www.biodiversity.be/files/1/2/4/1240.pdf
- Biodiversity and socio-economic impacts of Dutch trade in soya, palm oil and timber.
  Eric Arets http://www.biodiversity.be/files/1/2/3/1239.pdf
- Linking Dutch footprint to land-use, biodiversity and ecosystem services. An example showing benefits of Reduced Impact Logging (RIL) Forestry.
  Mark van Oorschot http://www.biodiversity.be/files/1/2/3/1238.pdf
- Agro-fuel policies: are certification systems efficient for controlling impacts?
  Monique Munting http://www.biodiversity.be/files/1/2/5/1255.pdf
- a European Commission study coordinated by VITO: The impact of EU consumption of food and non-food imports on deforestation.
  Dieter Cuypers http://www.biodiversity.be/files/1/2/4/1244.pdf
- **Group discussions** http://www.biodiversity.be/files/1/2/5/1257.pdf

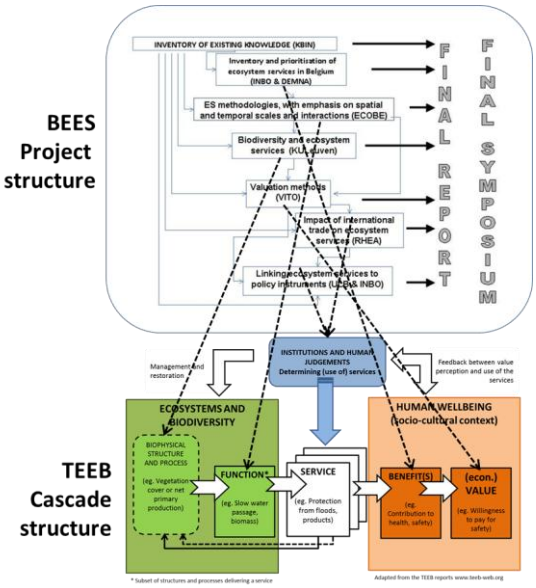
5.1.6 WP7 BEES WORKSHOP MARCH 2012 – BRUSSELS

Ecosystem Services and their (e)valuation: linking concepts, principles and values to policies?

- The value of monetary ecosystem service (e)valuations in policy formulations
  Arild Vatn
- Experiences from the institutionalization of ESS-(e)valuation: the case of TEEB
  Heidi Wittmer
- Co-constructing knowledge on Nature: a survey n the perception of the policy relevance of ecosystem services (e)valuation in Belgium
  Hans Keune
- Belgian Case Study, Institutional experience: "De Wijers"
  Wouter Van Muysen
- Belgian Case Study, Institutional experience: "Natuurwaardeverkenner"
  Tanya Cerulus
- Belgian Case Study, Scientific experience: "ECOfresh-project"
  Sander Jacobs
- Belgian Case Study, Scientific experience: "VOTES-project"
  Nicolas Dendoncker

5.2 The TEEBelgium conference

5.2.1 Why TEEBelgium?



During the course of the BEES project, more and more references to the TEEB process ("The Economy of Ecosystems and Biodiversity") occurred. The Economics of Ecosystems and Biodiversity study is a major international initiative to draw attention to the global economic benefits of biodiversity, to highlight the growing costs of biodiversity loss and ecosystem degradation, and to draw together expertise from the fields of science, economics and policy to enable practical actions moving forward (www.teebweb.org). In international fora, such as the Ecosystem Service Partnership (ESP) conference in Wageningen (The Netherlands) in July 2011, the TEEB workshop in Vilm (Germany) in October 2011, the TEEB conference in Leipzig (Germany) in March 2012, and on several informal occasions, the BEES project was presented and linked to the efforts of TEEB to instigate national and regional 'TEEB-like' initiatives. Also, The reporting and communication strategy of TEEB engendered a wide awareness and mainstreaming of the TEEB ideas, which very closely link to the approach taken in BEES (fig..). A second reason to align with TEEB was to involve businesses and sectors with a more economic drive (e.g. agriculture), where the TEEB reports had already partly percolated. The BEES consortium felt that this was a necessary step as these sectors were not well represented among the total workshop participants.

After several direct contacts with the coordinating TEEB office at UNEP Geneva, the final conference of BEES was given the explicit mentioning of TEEB. Indeed, from the 140 participants of the TEEBelgium conference, 14 were linked to business or financial administrations, while 16 could be placed in the traditional agriculture sector. In this sense, the end-conference not only presented results from the BEES project, but continued the formation of a broader community on the value biodiversity.

5.2.2 End conference report

TEEBelgium D0 conference

Prospects for an efficient, sustainable and equitable economy

April, 27th 2012 – Royal Academies for Science and the Arts of Belgium – Brussels

The full conference report presentations and pictures are available on www.TEEBelgium.be.

Official opening and introduction

Speaker: prof. Patrick Meire, University of Antwerp (UA)

Ecosystem services are important in everyday life, from producing our meal to regulating soil and water processes. Hence, it is important to improve our understanding about this concept, all biophysical, economic, social and political aspects. The BEES project (Belgium's Ecosystem Services) aimed to explore this in particular for the Belgian situation. The relevance of this interdisciplinary research topic could be seen from the success of the European TEEB report (The Economics of Ecosystems and Biodiversity) for international policy, business, agriculture and the environment. The aim of today's TEEBelgium conference is first to start a Belgian *community of practice* on ecosystem services to broaden the scientific base, to bring together policy makers from different sectors, to involve enterprises, unions, ngo's, etc., and second to develop *concrete tools* to make the Belgian economy more efficient, sustainable and equitable.

Morning session: findings of the BEES project
Chair: Hendrik Segers

ES research in Belgium: an overview

Speaker: Dimitri Brosens, Belgian Biodiversity Platform

An inventory of the Belgian research was extracted from potentially related ES projects, after expert assessment and scoring. More information is to be found on the website http://biobel.biodiversity.be/. From the website: "BioBel is a reference database developed by the Belgian Biodiversity Platform (an initiative of the Belgian Science Policy) that provides a unique and centralized access to the expertise and resources available in Belgium in the field of biodiversity."
The Belgian research on ecosystem services clearly increases over time, the same trend can be seen in Europe and even worldwide. A variety of funding and cooperation structures was observed, and interdisciplinary projects such as BEES have appeared during the last years.
The magnitude of ecosystem services related research would be even larger, since a lot of this research is translated to policy and hence published in 'grey literature'.

ES in Belgium: how to set priorities

Speakers: Dr. Hans Keune, Belgian Biodiversity Platform & Dr. Francis Turkelboom, INBO

The importance of ecosystem services is generally recognized but prioritization is needed in order to create a regional plan. But: which ecosystem services are most important? Who decides (experts only/Bottom up/Stakeholder discussion)? Based on what (only economics/Or multiple values/Social wellbeing, health)? Combine analysis and debate (analytical-deliberative approach)? Three examples of a bottom-up approach were discussed to illustrate how prioritization on ecosystem services can be made. The first example was about individual prioritization of ecosystem services based on a card game (case Gelinden agricultural area). The second example was an illustration of the deliberation by multiple stakeholders to develop a regional vision based on workshop series (case De Wijers). The last example was a multi-criteria analysis to compare different scenarios (regional plans) by using different weighting factors.

Measuring ES: science or pragmatism

Speaker: Dr. Sander Jacobs, University of Antwerp (UA)

After identifying ecosystem services, the next step is to quantify the ecosystem services. But, what do you want to measure? Different ecosystem services appear either on a global or local level, with both positive and negative effects between different ecosystem services (trade-offs!) and with spatial variability. According to the TEEB foundations "you have to look at bundles of ecosystem services" and "you have to study at the case study scale". To support policy quick and simple answers that are 100% right are expected, but scientists are confronted with many research challenges and are hence not able to easily answer the policy questions. The solution lies in simple indicators including complexity, uncertainty, credibility, flexibility and acceptance.
A prototype model was created to map ecosystem services. In a first step a total 'bundle indicator' was developed and in a second step a map was designed based on a pixel-based approach. These maps can show policy makers the consequences of (different) decisions and can form a basis for informed decision making.

The Biology of Ecosystem services

Speaker: Tom de Bie on behalf of prof. Luc De Meester, University of Leuven (KUL)

The link between biodiversity and ecosystem services is widely discussed. We generally know that ecosystems deliver us a lot of services, but it is less obvious to claim that these ecosystem services are directly related to biodiversity. The causal relationship between biodiversity and ecosystem services is not easy to study in the field and experimental analysis are also not easy. Some field studies exist, for example related to bees and agricultural productivity. There were several mechanisms found by which biodiversity may boost ecosystem functioning. The importance of biodiversity increases when concerning multiple functions and when spatial and temporal variability increases. Biodiversity may be to provide insurance. A direct link between biodiversity and ecosystem services is good news! But, also bad news! Due to mass distinction, habitat fragmentation and unpleasant positive feedbacks, negative evolutions in biodiversity may lead to negative effects on ecosystem services. Depending on the biodiversity condition, other ecosystem management types are required. In natural areas high biodiversity is assumed and the management focus should be on

nature conservation and restoration measures. In an intensive used area where biodiversity is rather low, management should be focused on TS and technological engineering. In area in between a focus on ecosystem services and adaptive ecosystem management is recommended.

Counting the benefits of Biodiversity: opportunities and challenges

Speaker: Inge Liekens, Flemish Institute of Technological development (VITO)

What is our nature worth? One of the main issues in the ecosystem services debate is the question "why" and "how" we can put a monetary value on nature. Arguments for ecosystem valuation are to create a good link between biophysical and economic information, to simplify comparing scenarios and to evaluate a bundle of ecosystems (no adding up problem is you use the € unit). Applications why this would be of interest are communication and awareness raising, cost-effectiveness analysis, impact assessment like cost-benefit analysis (win-wins and "gain money") and payment for ecosystem services. However, data to implement all ecosystem services in those monetary valuation tools is lacking. Methodologies to put a monetary value on nature are based on market prices and on a range of non-market valuation methods like replacement costs, travel costs and stated preference methods (contingent valuation and choice experiments). Especially in Belgium, were few original studies exist on ecosystem functioning for certain ecosystems and specific ecosystem services, benefit transfer is needed because of lacking data (and because of lacking money and time for data creation on a case study base). But this goes along with a high risk for transfer errors since every case has a unique environmental context.
In Flanders the internet tool Nature Value Explorer v 1.0 is developed to identify, quantify and monetize ecosystem services for a various range of case studies. This tool can be found on the website http://rma.vito.be/natuurwaardeverkenner, and an extension is planned for the end of 2012 with additional ecosystem services, spatial issues, etc.

Think global: international trade of ES

Speaker: Dr. ir. Alain Peeters, natural Resources, Human Environment and Agronomy (RHEA)

Global trade is important for instance for food commodities but these economic activities have major impacts on ecosystems. Important examples are soybean production, palm oil production, agro-fuel production, flower and vegetable productions, tropical wood, shrimp and fish farming, over-fishing in oceans and tourism. The latter has clear negative impacts but also important positive impacts on ecosystem services.
Soybean import by EU27 countries largely increased during the last centuries, basically due to a large increase in animal feed imports which constitutes for 83% of soy (in 2008). Global trade has huge impacts in developing countries (due to export). More specifically, soy cultivation expands at the expense of the last remains of the Atlantic forest, the Cerrado savannahs, the Amazonian forest, the Campos grasslands and the Pampa. All these areas are very species rich and with a high biodiversity. Global trade has also huge impacts in Europe (due to import). In the EU27 countries, permanent grassland areas are converted into forage maize and cereals crops because high protein soybean meal is used more and more as a cheap substitute of grassland proteins. Based on the land use changes, the total socio-economic cost of soy import to the EU27 countries was estimated. These changes in animal feeding have also strong consequences on human health (ex.: obesity, coronary

heart diseases). That exemplifies the link between biodiversity destruction and human health degradation.

ES in policy making: what knowledge is (not) needed?

Speaker: prof. Tom Bauler, Université Libre de Bruxelles (ULB)

The research on ecosystem services has an important focus on supporting policy making and decision making with the underlying assumption that governance of biodiversity/nature is in need of renewed "evidence for policy-making". However exploring this policy instrumentation requires to keep in mind three important questions regarding: neutrality (policy concepts and tools carry intrinsically a specific set of values, representation of an issue and principles of actions), independence (policy actors and institutions have a past when designing policies) and objectivity (there is no evidence that values change values). Our survey revealed that in Belgium the concept of ES percolates through a double dynamic: at the federal level, the percolation is so far limited to programmatic policy documents and is mainly influenced by international initiatives; at a regional level, percolation is encouraged by scientific actors but differences are observed between Brussels, Wallonia and Flanders. The concept and valuation of ES are acclaimed as powerful communication tools, but the perception of valuation is largely/exclusively hijacked by monetary valuation, which leads to rejection and resistance against valuation of ES. Policy science literature does support this calls for caution. The consequences of conceptualising ecosystem functions as services are unclear and are perceived as more than sheer semantics. Policy instruments, tools, concepts are not neutral; they produce specific effects, independently of the objective pursued.

Bits & pieces of discussion and questions from the audience

More attention should be given to the ecosystem services debate and bringing together different stakeholders. For that reason, a community of practices is recently established, but this is not as easily funded as scientific projects.

Many ecosystem services are 'imported' from tropical countries, but would be possible to increase the export of 'knowledge' on ecosystem services to those countries? How can we make the instruments and concepts for ecosystem services applicable to other countries? The concept of ecosystem services is still relatively new, we are still in the beginning of the ecosystem services research. On the other hand, the link between biological control and agricultural productivity is already known for a longer time. China is already 'importing' a lot of knowledge on ecosystem services. Hence, the 'trade in ESS knowledge' is in development. The international bureau for environmental studies newly established the intergovernmental platform biodiversity and ecosystem services. The aim is capacity building and generalization and prioritization of knowledge.

Monetary valuation methods are important for policy making to calculate the return on investment. But this is not (yet) applicable for most ecosystem services. Alternative non-monetary methods useful for policy making are for example multi-criteria analysis to compare scenarios or mapping of ecosystem services. A new idea is that there might be no need for monetary valuation of all ecosystem services. Benefits can be proofed by value some ecosystem services for which good monetary data is available, and in addition the benefits of other ecosystem services can be suggested without monetary values (e.g. cost effectiveness analysis). Monetary valuation methods now only focus on small (marginal) changes. The challenge is now to focus also on bigger changes/shocks in

ecosystem services (e.g. thresholds of ecosystem services, what is the minimum needed level of ecosystem services, etc…?).
Belgium follows the international guides (like MEA and TEEB) and also uses the Gross Domestic Production as indicator for human wellbeing. Is the monetary approach really needed? Other indicators have been suggested without a strong focus on money. Belgium cannot 'resist' against monetary valuation in policy making. More important is to focus on how to do it and how to use the available methods in our environmental policy.
Are politicians able to take sound decisions? No! Policy is focused on short term decisions, whether large challenges are long term. Different rationalities exist between politicians and scientists and both parties have to deal with this fact. Politicians want scientific evidence to support political decisions, but scientists blame politicians to take political decisions. A large gap exists between science and policy. Both parties seem prepared to bridge this gap, but many stones have still to be produced on both sides to effectively build the bridge. The start of a community of practice on ecosystem services, including scientists, policy makers, practitioners, sectoral representatives and enterprises is an important first step in this

Afternoon session: future of ecosystem services in Belgian policy and practice,
Chair: Prof. Patrick Meire

KEYNOTE 1: The Economy of Ecosystems & Biodiversity: TEEB accomplishments & prospects
Speaker: Dr. Heidi Wittmer, TEEB scientific coordination, UFZ Leipzig

The TEEB initiative is about quantifying monetary values of ecosystem and biodiversity, the economic importance of and economic distortions affecting ecosystems and biodiversity, the use of economic instruments to legislate ecosystems and biodiversity, the use of ecosystems and biodiversity in an economically efficient way, and the significance of ecosystems and biodiversity for the livelihood of poorer parts of society. The TEEB activities are still in progress and "Phase 3" about implementation and facilitation is going on right now. The focus is now on communication and supporting national and local TEEB studies.
The Belgian TEEB initiative may act as an example to illustrate how the application of TEEB at a national level can bring advantages for the society. It can provide a new language to bring the environment beyond the environmental sector and strengthen the interaction between policy and science.

KEYNOTE 2: "EU prospects on maintaining and restoring ecosystems and their services"
Speaker: Anne Teller, Administrator at EU DG Environment

The 'European Biodiversity Strategy to 2020' is founded in May 2011. Important aspects are the valuation of our natural assets to deliver multiple benefits, building on the biodiversity knowledge base and create a framework for action for the next decade. This consists of six mutually supportive and interdependent targets broken down into a package of actions. 'Target 2' is about maintaining and restoring ecosystem services, based on an ecosystem assessment. The general objective is to maintain and enhance ecosystem services through the establishment of green infrastructure and the restoration of at least 15% of degraded ecosystems by 2020. Several actions are developed. 'Action 5' aims to improve knowledge about ecosystems and their services in the European Union. All EU

members have to map and assess the state of ecosystems and their services in their national territory by 2014, assess the economic value of such services, and promote the integration of these values into accounting and reporting systems at EU and national level by 2020. A new web platform is founded and can be consulted at http://biodiversity.europa.eu/ecosystem-assessments.
Ecosystem services are also subject of other environmental policy areas like the roadmap to a resource efficient Europe (2011), the water framework directive implementation about the integration of ecosystem services in river basins, and the blueprint for safeguarding Europe's water (2012).
On a global level, trade agreements are an important strategy to 'control' global trade and the related global environmental problems. The export of environmental problems and ecosystem services should be avoided by all means. This can be realized by a global focus on sustainable consumption and production at all levels.

5.3 The BEEScommunity

The BEES project, though largely focused on scientific issues, also stressed the need for socially and policy-relevant knowledge. Capitalizing on this project, the BEES expert community aims to further engage a variety of Belgian policy and private sector representatives, together with the expert community in a process of close consultation and collaboration. This BEEScommunity will facilitate the policy uptake of expert knowledge and improve the policy relevance of future scientific work. It further aims to build bridges to other sectors in society, such as the business and NGO sectors, in order to mainstream the insights of the ecosystem services community and to collaborate in practice-oriented projects.
The research community involved in ecosystem services reiterates that producing policy-relevant scientific knowledge and maintaining a relevant and knowledgeable expert basis requires significant and continued support, both through active engagement of policy makers and stakeholders in the transdisciplinary scientific process, and through provision of enabling resources.

On April 26th of 2012 a group of Belgian ecosystem services experts from both science and policy convened and decided to establish a "Community of Practice" on ecosystem services in Belgium. They agreed upon the following aims of this BEES community:

- Develop mainstreaming/policy tools and practical applications, to promote the uptake of ecosystem services concepts in policy and management, business and society;
- Facilitate capacity building, exchange of expertise and experience, to enable involvement of Belgian experts in international initiatives and build the capacity to conduct assessments;
- Provide an overview of state of the art knowledge, review and test tools and best practices.

The BEES community is an open and flexible network that will serve as interface between different societal sectors. It is open to all potentially interested organizations., and the subscribers invite representatives of all potentially interested organizations to engage in the community. It is flexible in the sense that it will be informal in its functioning, organization and membership. Its activities will be demand-driven, and responsive to societal needs. The BEEScommunity will serve as national contact point to represent, promote and engage Belgian ecosystem services experts in relevant national and international initiatives such as the Intergovernmental Platform on Biodiversity and Ecosystem

Services (IPBES), the EU Working Group on Mapping and Assessment of Ecosystems and their Services (MAES), The Economics of Ecosystems and Biodiversity (TEEB), the Ecosystem Services Partnership (ESP), ...

In concreto, The BEES community is supported by a secretariat facilitated by the Belgian Biodiversity Platform. Several thematic meetings (eg. ES and Transition Management) have been held, and in the light of new research projects, this community will have an important participatory role.
On the occcasion of the to be published BEESbook (expected end of 2012 or beginning of 2013), the BEEScommunity will organize a public event and announcement in order to further broaden its base of engaged partners. So far, the group has met during the BEES Round Table meeting in April and via two recently established BEES Working Groups: one supporting the EU Mapping and Assessment of Ecosystems and their Services (MAES) project and one on transition management. For more information: http://www.beescommunity.be/.

5.4 The BEESbook

During the course of the BEESproject, the fate of the workshop output was debated among the partners, participants and administrators. The first basic products, being open-ended discussion notes and literature reviews as well as workshop presentations, did not provide a concise, accessible and scientifically sound output. Yet, some of the workshops resulted in valuable and high quality reports. However, these outputs differed strongly depending on the subject of the workshop, the clarity of its questions and the consensus on readily available answers or solutions.
On the other hand, the material produced and collected is of high scientific quality and value, and should be shared within the wider ES research community. Several workshops resulted in papers which are eligible for submission with scientific peer reviewed journals. Again, this eligibility differs between work packages depending on the clarity of results and discussion, and the possibility to report this in scientific paper form.
As the main public targeted with the results are both researchers, research administrations, informed and interested government officials and experts, local practitioners and students, the consortium finally opted for a peer reviewed book, containing the main debates and reviews from within the project, but widening contributions to the informal expert network that had been built. The first review-ready draft of this publication, with BEESbook as a working title, is now being finalized and submitted for international review.
The book will provide an accessible introduction in the very broad range of debates and topics of importance concerning ecosystem services. While these debates are globally relevant, the case study examples and experiences stem mainly from within the Belgian context.
Authors from six Belgian universities (UA, KUL, FUNDP, KUL, UGent, ULB) and four research institutions (VITO, INBO, BBPF, RHEA) contributed directly to this book. The book will be reviewed by internationally renowned experts and published under peer reviewed quality guarantees. A tentative table of content is provided here.

Working titles BEESbook (order to be decided)
Preface
Scientific research on ES: a Belgian perspective
ES BASICS
Challenges for Land and Resource use
Ecosystems, biodiversity and their services
Integrated ES valuation.
Ecosystem services, their value and economy.
Ecosystem services based governance
ES DEBATES
The biology of ES: linking ES and biodiversity
CICES - A framework for ES classification
Negotiated complexity in ES science and policymaking
ES-concept and (e)valuations: a policy document analysis
The ES valuation tool and its future developments
Valuation of ES: challenges and policy use
Mapping & quantifying ES: science or pragmatism?
International trade, biodiversity and ecosystems
Ecosystem service indicators: Are we ready to measure ecosystem performance?
An index for mapping delivery of ecosystem service bundles
ES thinking in rural development and land use
The natural relation between biodiversity and public health: an ecosystem services perspective
Enhancing ecosystem services in Belgian agriculture: a vision for farming with a future
Reflections from practice
The way ahead for ES research and practice

The book will be distributed very selectively for review in fall 2012, and published in spring 2013. It is coauthored by over 25 researchers active in Belgium's ES research, and reviewed by over 40 nationally and internationally renowned specialists. A section with reflections from practice and policy will be provided for different sectors involved, and the way ahead for ES research and practice in Belgium and beyond will conclude this publication as a final product, resulting from the BELSPO funded BEES project and their continued support for the emerging BEEScommunity.

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