

Chapter I - Overview of biodiversity status, trends, threats and implications for human well-being

1. Importance of biodiversity in Belgium

1.1. Context

Biological diversity, or biodiversity, is the term given to the variety of life on Earth. The biodiversity we see today is the fruit of billions of years of evolution, shaped by natural processes and, increasingly, by the influence of humans. It forms the web of life of which we are an integral part and upon which we so fully depend.

This diversity is often understood in terms of the wide variety of plants, animals and microorganisms. So far, about 2 million species have been identified. Scientists reckon that there are actually about 13 million species, though estimates range from three to 100 million.

Biodiversity also includes genetic differences within each species, for example between varieties of crops and breeds of livestock. Chromosomes, genes, and DNA determine the uniqueness of each individual and each species.

Yet another aspect of biodiversity is the variety of ecosystems such as those that occur in deserts, forests, wetlands, mountains, lakes, rivers, and agricultural landscapes. In each ecosystem, living creatures, including humans, form a community, interacting with one another and with the air, water, and soil around them.

It is the combination of life forms and their interactions with each other and with the rest of the environment that has made Earth a uniquely habitable place for humans. Biodiversity supports and plays an important role in the way ecosystems function and in the many services they provide.

These services are often grouped into four categories: provisioning services (e.g. food, medicines, wood), regulating services (e.g. climate regulation, water and air purification, pollination), cultural services (e.g. recreation and tourism, education, inspiration) and supporting services (e.g. water and nutrient cycling, primary production).

1.2. Some studies in Belgium

Research on the importance and value of biodiversity and ecosystem services is a rather recent research topic in Belgium. Yet, several studies and reports have been or are undertaken.

1.2.1. Importance of biodiversity for ecosystem services

The Flemish Research Institute for Nature and Forest published a report focussing on biodiversity as a basis for ecosystem services in Flanders. For each ecosystem service they addressed, the authors gave a definition, underlined the contribution of biodiversity, illustrated the interaction between functional biodiversity and the ecosystem service, gave the actual trend, and proposed measures to strengthen the ecosystem service and the underlying biodiversity. The report (in Dutch) is available at: <http://www.inbo.be/files/bibliotheek/90/240790.pdf>.

The assessment of the values of green spaces in urban and urbanising areas and the values for areas protected under Natura 2000 highlighted the benefits of ecosystems for society - see under 1.2.2. and 1.2.3.

The website <http://www.natuurwaardeverkenner.be>, called the "nature value explorer", is a calculation tool to value ecosystem services and can help everyone who wants to map the socio-economic importance of ecosystems. The calculated figures inform policy makers of the gain or loss of welfare resulting from the impact of a project or policy on the delivery of ecosystem services.

The University of Namur elaborated a scientific assessment of the services provided by the ecosystems in the Walloon Region. It contains among others a cartography of the ecosystem services in this part of the country. A case study was developed on the monetary value of the forest ecosystem services in the Walloon Region. Three of them (wood, big game and carbon sequestration) represents together more than 6.5 billion euros. When 14 different ecosystem services were taken into account, a value of 1,455 euro was calculated per hectare and per year. The report (in French) is available at: [http://etat.environnement.wallonie.be/download.php?file=uploads/rapportsetudes/Dossier%20scientifique%20SE_RW_VF\[1\].pdf](http://etat.environnement.wallonie.be/download.php?file=uploads/rapportsetudes/Dossier%20scientifique%20SE_RW_VF[1].pdf).

1.2.2. Importance of protected areas

The Flemish Institute for Technological Research and the universities of Antwerp and Ghent investigated the value of the Natura 2000-network in Flanders. They found out that the 166,000 hectares of protected areas in Flanders had among others the following benefits: more than 34 million tons of CO₂ stored each year, 4,000 to 8,000 tons of fine dust eliminated from the air each year, 16 million m³ of water purified each year and a gain of 2100 healthy life years (for about 1.8 million people), between 26 and 43 million visitors yearly. The experts concluded that the Natura 2000-areas in Flanders have a total value of 800 million to 1.2 billion euro for society. And this is still an underestimation given the fact that only 11 of the known 36 ecosystem services were taken into account. The report (in Dutch) is available at: http://www.natuurenbos.be/nl-BE/Natuurbeleid/Natuur%20en%20Natura%202000/Natura_2000/Waarom/Voordelen.aspx. For the summary in English: <http://www.natuurenbos.be/~media/Files/Themas/Natuur/Natura%202000/abstract%20estimate%20benefits%20Natura%202000%20-%20EN.pdf>.

1.2.3. Importance of biodiversity in the city

The Flemish Agency for Nature and Forests launched an inventory of the benefits of green in the city. The inventory identified not less than 14 ecological, social and economical benefits: climate mitigation, climate adaptation, air quality, noise mitigation, water management, human fitness and health, city agriculture, social cohesion, recreation and tourism, nature education, biomass, better housing and higher estate values, attractiveness to businesses. The inventory also shows the high costs when there is not enough city green. Full report and summary, both in Dutch, are available at: <http://www.natuurenbos.be/nl-BE/Natuurbeleid/Groen/Investeer%20in%20groen.aspx>.

1.2.4. Some other valuation and related studies

An example of an economic valuation study of a habitat is the one carried out on the value of the Heverleebos-Meerdaalwoud in 2000. Putting together direct values (economic use: wood, mushrooms, other forest products, hunting permits, drinkable water, recreation, ...), indirect values (ecological use: carbon sequestration, pollution break down, noise absorption, mitigation of erosion, habitat for fauna and flora, ...), optional values (such as tourism) and existential values (intact natural landscapes, rare and

threatened species, aesthetics, ...) led to a yearly total value of more than 24 million euro for this forest of 2,000 ha, equalling more than 12,000 euro per hectare and per year. A Dutch summary of this study is available at: http://www.econ.kuleuven.be/ete/downloads/SUMMARY_VLINA1.pdf.

Other examples of related research projects are ECOFRESH (ECOsystème services of FRESHwater systems, <http://www.belspo.be/belspo/ssd/science/projects/ecofresh.e.pdf>, final report: http://www.belspo.be/belspo/ssd/science/Reports/ECOFRESH_FinRep_2012_AD_2.pdf), ECOPLAN (Planning for Ecosystem Services, a conference was held on 31.05.2013: http://www.ua.ac.be/main.aspx?c=*ECOB&n=76239), VOTES (Valuation Of Terrestrial Ecosystem Services in a multifunctional peri-urban space, <http://www.votes-project.be>). The latter project investigates how the values of ecosystem services are likely to change under different scenarios. The issues of trade-offs, transfer, communication and distribution of ecosystem services are examined under economic, social and environmental perspectives with the local community and stakeholders. Development of new and/or adaptations to existing policy instruments is suggested, which implement the developed methodology into decision-making processes.

1.3. Belgian community of practice on ecosystem services

Given the importance assigned to the subject, a Belgian community of practice was launched on ecosystem services (April 2012). The Belgium Ecosystem Services (BEES) Community (<http://www.beescommunity.be/en/>) is an open and flexible network that interfaces between different societal actors. The BEES community is open to all potentially interested organizations (policy, business, NGO's, science, consultancy, civil society,...). It was among others set up as a result of the BEES (Belgium Ecosystem Services) cluster of the Belgian Science Policy and the project 'BELgium Ecosystem Services - A new vision for society–nature interactions' (final report available on: http://www.belspo.be/belspo/SSD/science/Reports/FinalReport_BEES%20ML.pdf).

The BEES Community has the following objectives:

- Develop ecosystem services concepts, tools and practices that help to adapt human activity and clarify ecosystem thresholds in order to preserve the actual and potential well-being of present and future generations; and to stop ecosystem and biodiversity degradation, and improve their status.
- Develop mainstreaming & policy tools to promote the integration of ecosystem services concepts in policy and management, business and society.
- Facilitate capacity building, exchange of expertise and experience: including methodologies and transfer of knowledge on Belgian ecosystem services to policy and share the needs from policy makers on this issue, to enable involvement of Belgian actors in national and international initiatives and build the capacity to conduct assessments of ecosystem services.
- Provide overviews of state of the art knowledge and best practices

On 27.04.2012, a conference on The Economics of Ecosystems & Biodiversity in Belgium was organised in Brussels. The programme and presentations are available at <http://www.teebelgium.be/page/show/7>. The themes and presentations of previous workshops are available at <http://www.teebelgium.be/page/show/4>.