

# Ecosystem Goods and Services

## EN Ecosystem

### Supporting service



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Honey bee populations are falling. They are needed to pollinate many agricultural crops and their loss would have significant economic impacts

*How complex and unexpected are the checks and relations between organic beings, which have to struggle together.*

Charles Darwin: *The Origin of Species*

- Ecosystems underpin all human life and activities. The goods and services they provide are vital to sustaining well-being, and to future economic and social development.
- The benefits ecosystems provide include food, water, timber, air purification, soil formation and pollination.
- But human activities are destroying biodiversity and altering the capacity of healthy ecosystems to deliver this wide range of goods and services.
- In the past, societies often failed to take account of the importance of ecosystems. They were frequently regarded as public property, and consequently undervalued.
- Scientists are predicting that an increase in world population to 8 billion by 2030 could lead to dramatic shortages of food, water and energy.
- The loss of services from natural ecosystems will require costly alternatives. Investing in our natural capital will save money in the long run, and is important for our welfare and long-term survival.
- Greater awareness of the economic value of ecosystem goods and services is needed among decision-makers and the public at large. If we fail to act now to stop the decline, humanity will pay a high price in the future.

nature



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## Fact 1: Humanity needs 'ecosystem goods and services'

An 'ecosystem' is a complex and dynamic combination of plants, animals, micro-organisms and the natural environment, existing together as a unit, and depending on one another. 'Biodiversity' comprises all the myriad living elements of these partnerships.

Some ecosystems are familiar, and others more exotic:

- A meadow is an ecosystem in which insects pollinate flowers and grasses. Cattle feed on these plants, and their manure, broken down by organisms in the soil, helps in turn to nourish the earth the plants grow in. Each element of the cycle depends on others for survival.
- Coral reefs form ecosystems in which fish and coral formations, rock and seawater interact together. Some 500 million people worldwide use coral reefs for tourism, fishing, pearl culture and other activities.

The Earth's ecosystems provide humanity with a wide range of benefits known as 'ecosystem goods and services'. Goods produced by ecosystems include food (meat, fish, vegetables etc.), water, fuels, and timber, while services include water supply and air purification, natural recycling of waste, soil formation, pollination, and the regulatory mechanisms that nature, left to itself, uses to control climatic conditions and populations of animals, insects and other organisms.

Because many of these goods and services have always been freely available, with no markets and no prices, their true long-term value is not included in society's economic estimates.

Experts have identified four different kinds of services, all vital to human health and well-being:

- **Provisioning services** supply the goods themselves, such as food, water, timber and fibre.
- **Regulating services** govern climate and rainfall, water (e.g. flooding), waste, and the spread of disease.
- **Cultural services** cover the beauty, inspiration and recreation that contribute to our spiritual welfare.
- **Supporting services** include soil formation, photosynthesis and nutrient cycling, which underpin growth and production.

Since some important services may yet be unidentified, we should take a precautionary approach to preserving our natural capital.



### Provisioning and regulating services

Clean water supply is crucial to human health and survival

## Cultural service



Tourists and campers enjoy the beauty of natural ecosystems

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## Fact 2: Biodiversity loss is destroying ecosystem functions

The biodiversity essential to ecosystem survival is under pressure, and much has already disappeared. Land-use change, including agricultural intensification and urbanisation, over-exploitation, pollution, climate change, and incoming species that compete with native flora and fauna, are all damaging natural ecosystems. Once destroyed, they are often costly and sometimes impossible to restore. Recent studies show that:

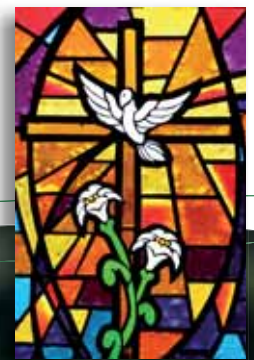
- 11% of the natural areas in the world in 2000 could be lost by 2050;
- Almost 40% of existing agricultural land risks being turned over to intensive farming;
- 60% of coral reefs could disappear by 2030;
- In Europe, up to 80% of protected habitat types are under threat;
- Human activities have multiplied extinctions of species by 50-1 000 times in the last 100 years.

Poor people, notably in developing countries, are most at risk from the loss of biodiversity, since they often rely directly on ecosystem goods and services.

Clearly, we are spending the Earth's natural capital too fast. Preserving ecosystems is an ethical duty as well as a practical necessity, for current generations and those to come. Humanity needs to understand that it is just another strand in the web of life, and we can no longer continue to exploit the planet without paying the price.

## Fact 3: If we fail to act, we will pay a heavy price

Valuing ecosystem goods and services in financial terms is a Herculean challenge. Past estimates have reached trillions of euros per year. Meeting in Potsdam, Germany in March 2007, Environment Ministers from the world's major economies agreed to launch a global study on the economic benefits of biological diversity, comparing the costs of loss and of effective conservation measures.



## Cultural service

Nature plays a vital role in preserving people's spiritual well-being

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The resulting study – *The Economics of Ecosystems and Biodiversity* (TEEB) – is an initiative of the European Commission and Germany, with several other partners. Its first publication, the TEEB interim report of May 2008, made a preliminary attempt to produce a global quantitative picture, valuing the annual loss of ecosystem services at €50 billion. It estimated that if nothing is done, the loss of terrestrial biodiversity alone could cost 7% of GDP by 2050, with loss of marine ecosystem services adding substantially more. The report put forward recommendations such as ending environmentally harmful subsidies and creating 'markets' for ecosystem services.

The second phase of TEEB (2008-2010) will propose a detailed framework for the economic valuation of ecosystem services, with their value taken into account in decision-making at all relevant levels. This is also expected to contribute to the United Nations' Millennium Development Goals.

### Fact 4: The EU is taking action

The EU Biodiversity Action Plan (2006) sets out what needs to be done to halt the loss of biodiversity by 2010. The Mid-term Assessment of this plan (2008) showed the difficulty in meeting the target. All partners need to step up and maintain their efforts, after 2010 as well.

Internationally, the EU is promoting better governance, and strengthening the rules that help to protect ecosystems. The EU is one of the 191 Parties to the UN Convention on Biological Diversity (CBD). Recent initiatives through the CBD include standards to ensure biofuel production is sustainable, criteria for marine protected areas (MPAs), and including biodiversity in climate change negotiations.

The EU earmarks millions of euro in external aid for biodiversity conservation. It also addresses the issue in trade negotiations, through sustainability impact assessments (SIAs). One key international objective is sharing the benefits of genetic resources – an important product of ecosystems – in a fair and equitable way.

### Fact 5: The Natura 2000 network protects ecosystems

Natura 2000 is the cornerstone of EU Biodiversity Policy. It is a network of more than 25 000 conservation sites all over the EU, and it provides extensive socio-economic benefits. These include direct benefits from tourism and recreational activities, but also ecosystem goods and services such as flood control, de-pollution of water, pollination, and nutrient re-cycling.

In 2007-2008, the Commission started moves to refine its cost estimates and develop better ways to assess the socio-economic benefits associated with the network and individual sites.

### Fact 6: We need a framework that values ecosystem goods and services

Unless natural ecosystems are safeguarded, the goods and services they provide will become increasingly rare and sought after. For example, at the moment we seldom pay for the real value of water supply, but this may not always be the case. In May 2008, long-term drought forced the city of Barcelona to start importing water from elsewhere in Spain, at an estimated cost of €22 million per month.



Provisioning service

Animals, such as sheep, do not only supply us with food. For centuries mankind has needed them for clothing, transport and company



Provisioning service

Humanity uses timber for building, heating and shelter. Forests also absorb harmful CO<sub>2</sub>.



Cultural service

Artistic inspiration is one of the 'cultural services' that ecosystems provide. Van Gogh recreated sunflowers in some of his finest paintings



Provisioning service

We rely on crops and plants for basic foodstuffs such as bread, rice and pasta, as well as the fruit and vegetables that make up a healthy diet

## Supporting service

Photosynthesis by plants captures carbon and provides air we can breath

## The Millennium Ecosystem Assessment

Ecosystem assessment is a means of evaluating the many different aspects of ecosystem health, and the delivery of ecosystem goods and services. In 2000, the United Nations launched a global Millennium Ecosystem Assessment initiative (MA). The MA report, completed in 2005, found that two-thirds of the Earth's ecosystem services are in decline or threatened. As part of the global MA follow-up initiative, the EU is committed to developing a sub-global assessment (SGA) for the European Region. A new global assessment is due in 2015.

## Provisioning service

Naturally occurring substances from plant species form the basis of more than 50% of prescription medicines

The European Environment Agency (EEA) has highlighted the need for ecosystem accounting techniques to analyse the relationship between economic sectors and their reliance and impacts on ecosystem goods and services. Ultimately, this data should feed into policy-making and local management of natural resources. According to EEA calculations, the global value of the general services from wetlands – such as water purification and carbon absorption – could be around €2.5 billion per year.

Payment programmes for ecosystem services are being developed in many countries around the world. They are essential in providing adequate rewards to landowners who protect ecosystem services that are valuable to society.

## Fact 7: The understanding of the importance of healthy ecosystems is growing

Recent developments at EU level demonstrate that policy-makers are changing their perspective and are integrating ecosystem health into some sectoral policies. For example:

- The EU Directive on pesticides is being revised to give greater protection to specific species, such as bees.
- The EU rural development policy 2007-2013 provides aid for farmers who sign up to environmental commitments.
- The Reform of the Common Agricultural Policy aims to strengthen landscape protection and reward farmers who go beyond traditional methods to plant hedgerows, create ponds or leave fields uncultivated.

More accurate knowledge is needed to improve our understanding of the links between biodiversity, ecosystems and human well-being. The proposal for an international science-policy mechanism aims to strengthen independent scientific assessment and advice to global policy-making on biodiversity and ecosystem services. And within the European Research Area, the EU and Member States need to ensure that research funding adequately supports biodiversity policy.

## Further reading:

### DG Environment TEEB website:

[http://ec.europa.eu/environment/nature/biodiversity/economics/index\\_en.htm](http://ec.europa.eu/environment/nature/biodiversity/economics/index_en.htm)

### Millennium Ecosystem Assessment report:

<http://www.millenniumassessment.org/documents/document.356.aspx.pdf>

### A mid-term assessment of implementing the EC Biodiversity Action Plan, annex 3:

[http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/consolidated\\_profile.pdf](http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/consolidated_profile.pdf)

### EEA Briefing: Ecosystems services – accounting for what matters:

[http://www.eea.europa.eu/publications/briefing\\_2008\\_2](http://www.eea.europa.eu/publications/briefing_2008_2)

### GreenFacts factsheet:

<http://www.greenfacts.org/en/ecosystems/>

### Grasping the climate crisis – A provocation from the Tällberg Foundation, Sweden:

[www.tallbergfoundation.org](http://www.tallbergfoundation.org)

### Ecosystem services and biodiversity in Europe,

by European Academies Science Advisory Council (EASAC):

[www.easac.eu](http://www.easac.eu)

