What are ecosystem services?
How do they influence our lives and well-being?

Ecosystem services (ES) are the services nature provides us, thus supporting our well-being.

Often the natural contribution of these services is interwoven with human labour or other forms of intervention.

Despite the importance of these ecosystem services for our well-being and our economy, we are often not aware of how much of our daily lives depends on ecosystem services. The three main classes of ES are introduced below:

Nature provides food, raw materials and energy, which form the basis not only for our physical well-being but also for our economic activities in many sectors. Examples of these so-called provisioning services are timber from forests, water, biomass from grasslands and agriculture, and animal products such as milk, wool or meat.

Ecosystems also regulate many processes that manage the amount of water and the quality of soil, water, air or the conditions for the existence of plants and animals. Examples of regulating services are the regulation of water discharge through retention in wetlands, the regulation of air pollution through vegetation or the regulation of soil quality through the buffering in soil layers.

Finally, there are also non-material values that substantially contribute to human well-being and rely on ecosystems and their interaction. Examples of such cultural services are the beauty of mountain landscapes, the experience of nature, the inspiration and creativity initiated by nature or even spiritual experiences.

In our work, we focus on these services of ecosystems and the goods they provide, which are related to biotic activities, such as biomass production or regulation by biotic processes. Nonetheless, also abiotic outputs of nature, such as rocks or energy (hydropower, wind energy, solar energy) are relevant assets. They may be considered as “environmental services”, but not as ecosystem services in a strict sense of the definition, because they do not contain biotic factors.
Do ecosystem services have an economic relevance?

Yes – they do remarkably! Different studies have proven the economic relevance of ecosystem services. To give just two examples: missing flood regulation caused damages between 9 and 15 billion Euro in the Elbe flooding in 2002 in Germany. Every year about 76 billion Euro turnover depend on timber availability as raw material in Germany.

There are many different ways of calculating economic effects of ecosystem services. Common approaches are the determination of market values if services are similar to goods traded on markets, e.g. timber, deer or fruits or hedonic pricing reflecting e.g. higher rents in the surrounding of green spaces. Via contingent valuation the “willingness-to-pay” is analysed in questionnaires, asking how much people would spend to maintain for instance a rare or an endangered species. Travelling prices asses the preference of people to visit beautiful landscapes or recreation areas and therefore reflects the money and time they spend for travelling to these destinations.

Depending on the method chosen and the concrete conditions though, costs may and do differ significantly. Therefore, even if single numbers may be impressive, economic evaluation of ecosystem services should be carried out carefully and by economic and ecological experts together only.
What is the benefit of recognising ecosystem services?

Ecosystem services contribute substantially to our personal well-being and the viability of our economy – in short they are the basis for a good life.

A good starting point is to be aware of the interlinkages between the provision of ecosystem services and human well-being (benefits and the attribution of a value) and to understand which ecosystem services we depend on. In order to do so, we must know about their existence, the extent of their provision and their development over time. We should also be aware of how we influence the provision of ecosystem services through our human activities (pressures).

We need to recognise whether the ecosystem service is dominantly provided by natural processes (and their functions) and functions and to which extent also human interactions play a role; in other words, the ecosystem service is a co-production of ecosystem and human factors. A good example is the production of agricultural goods: Depending on type of cultivation practice the ratio of contribution to the final goods between the different factors varies to an extent, where natural ecosystem derived factors might become the minor share.

These factors are ecosystem services (derived from the natural capital), machinery and fertilizers (manufactured capital), skills and knowledge (human capital) as well as norms and institutions (social capital).

Ecosystem services may play multiple roles: sometimes they are a final output to the consumer (such as clean drinking water), sometimes they are an intermediate output that contributes toward provision of another ecosystem service (such as clean water as a habitat for fish, which are used as final output for food).
At present, there is no concept available for formally considering ecosystem services in decision making. However, they can be used as an informal basis and in the long-term may become part of legally based decision support instruments, such as environmental impact assessments or spatial planning. Two aspects of the ecosystem service approach are an advantage for decision making in terms of a sustainable development:

Ecosystem services explain how we, as humans, are dependent on and affected by the provision and maintenance of natural goods and functions. It is, therefore, in our very own interest to consider and support ecosystem services for the provision of a good life and enhanced well-being.

The trade-offs between different ecosystem services become obvious: if we intensify food production in floodplains, for example, we might have less flood regulation. Revealing such trade-offs, discussions about the effects of our activities on different ecosystem services could be based on a coherent, common, concept. This could be one building block for a regional environmental governance, in which a range of different stakeholders take a common decision about the sustainable development of their region.
How can we learn more about ecosystem services?

There are many ways of recognising ecosystem services and they can be assessed in different ways. Often we use indicators to measure the ecosystem services directly (e.g. in timber extracted from forests, water extracted from groundwater) or indirectly (e.g. water quality of semi-natural water carriers, different soil qualities to indicate soil fertility, people visiting places of natural beauty).

Displaying the spatial distribution of ecosystem services on a map makes this information much more relevant for decision making. It can show where which ecosystem services are of major importance and – if different time lines are used – also the change over time can be visualised.

It is not only important to learn about the supply (in the form of natural potential and the actual provided stock) of ecosystem services but also about their flow, i.e. their actual use by the beneficiaries. And it is very interesting to compare the provision of ecosystem services and the demand for them by our society and economy. This can for example reveal overexploitation of ecosystem services driven by a disproportionate demand and a flow forcing the provision of stock beyond the potential.

Moreover, we should not only focus on a single ecosystem service but look at the bundle (or sometimes called cluster) of different ecosystem services which are provided in a specific area.

It is close to impossible to measure every ecosystem service, as there are too many and efforts for data collection currently exceed the resources of public administration, scientific research and private/economic initiatives.