



## Soil Transformation of European Catchments (SoilTrEC)- Project Fact Sheet ([www.soiltec.eu](http://www.soiltec.eu))

### SOIL ECOSYSTEM SERVICES

Nature or natural capital can be considered a stock, which similar to man-made capital yields, through its multiple functions, gives a flow of goods and services into the future. Natural capital thus provides a flow of goods and services, usually called collectively ecosystem services, and are defined by the benefits people obtain from the biosphere and its ecosystems. Although often overlooked and taken for granted, soils as complex dynamic ecosystems, are one form of natural capital that must be maintained to ensure continued provisioning of soil ecosystem services.

The Millennium Ecosystem Assessment identified four different classes of ecosystem services: provisioning services, regulating services, supporting services, and cultural services. Provisioning services are defined as the products people obtain from ecosystems. Regulating services are the benefits people obtain from the regulation of ecosystem processes. Cultural services are the non-material benefits people obtain from ecosystems and supporting services are those that are necessary for the production of all other ecosystem services. Soil natural capital provides services in each of those service groups.

#### **Soil ecosystem services**

**Provisioning soil services:** Soils are fundamental for the production of biomass used as food, fodder or fuel. They contribute to the provisioning of clean water and are suppliers of raw materials such as topsoil, clay and bricks as well as peat. Soils also provide the physical environment for human infrastructure.

**Supporting soil services:** The soil gene pool serves as the main reservoir for biodiversity on Earth, and soils play an important role in the Earth's water and nutrient cycles, making water and nutrients available to terrestrial ecosystems.

**Regulating soil services:** Soils are important for biological controls of pests and diseases, for hydrological control through regulation of water runoff, for regulation of climate through carbon sequestration and for recycling and detoxification of waste.

**Cultural soil services:** Soils support various vegetation in different landscapes that have been the source of aesthetic influence for artists throughout the ages. They play a major part in religious beliefs, store our cultural heritage and thereby give insights to societies, climate and the environment of the past. Soils also provide the platform for various recreational opportunities and provide foundation to various education subjects.

Given these multiple functions of soils, collectively providing **soil ecosystem services**, it is clear that soils must be maintained and the only way to do that is to protect soil natural capital.

## **VALUING SOIL ECOSYSTEM SERVICES**

In a market economy, the dominant form of economic system in the western world, decision-making is largely based on signals provided by the market through market prices. As a result economic decision-making focuses on the allocation of market based goods and services that have a clearly established market price. As most soil ecosystem services are not formally exchanged in markets they do not carry a market price, and thereby are mostly invisible from economic decision-making. This has led to suboptimal use of soil ecosystem services, and degradation of soil natural capital. Economic valuation of soil ecosystem services highlights the economic importance of this vital resource and thereby illustrates the cost if degraded.

### **Economic valuation of soil ecosystem services**

Values derived from natural capital such as soils are broken into several types. The two main types of values are what are called **use value** and **non-use value**.

**Use values** are broken into direct and indirect use values. Direct use values include consumptive uses such as food (collection of berries, mushrooms, herbs and plants) or in the case of soil, topsoil, subsoil or peat as well as non-consumptive uses such as providing space for recreation. Indirect use values arise from soils when they fulfil services that are considered supporting and regulating such as carbon sequestration, hydrological buffering, and filtering of nutrients and contaminants, and biological control of pests and diseases. Non-use values are the values that people assign to economic goods even if they never have, and never will use it, e.g. paying for the protection of landscape they have never visited.

When assessing the economic value of soil ecosystem services, services are first classified into appropriate service groups, identifying the type of value derived from the service and then relying on appropriate economic methods the service is translated to economic values.

Various studies however have illustrated the economic importance of individual services giving a value range from 20 ID to 6420 ID per hectare, revealing that the total value of soil ecosystem services is likely to be significant, where ID stands for international dollars.

Based on these concepts the SoilTrEC project has developed an operational framework for comprehensive assessment of the economic value of soil ecosystem services.

**For more information visit SoilTrEC website: [www.soiltrec.eu](http://www.soiltrec.eu)**

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