



European Network of Heads of Nature Conservation Agencies (ENCA)

ENCA is an informal network which fosters exchange of information and collaboration amongst its partners, identifies future challenges and offers information and advice to decision-makers in the field of nature conservation and landscape protection.

ENCA brings together scientific evidence and knowledge of practical application together with experiences in administration and policy advice in the context of biodiversity and ecosystem goods and services. More details can be found at www.encanetwork.eu.

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Integrating Soil Biodiversity Conservation into Sustainable Land Use

ENCA Engagement piece

Executive summary

The EU Soil Health Law will set a new legal basis for the protection of soils and the conservation of its associated biodiversity. The plan of action for the conservation and sustainable use of soil biodiversity adopted at COP15 of the UN Convention on Biodiversity (CBD), together with the *Biodiversity Strategy for 2030* and the *EU Soil Strategy for 2030* lay the ground for a coherent set of actions. A sound monitoring framework will need to be established that allows for an assessment of progress and the success of the proposed measures. ENCA acts as a platform to exchange knowledge on the assessment and monitoring of soil organisms and experiences in its conservation and sustainable use. ENCA likes to propose the following points, in order to make the Soil Health Law an effective tool for the conservation and sustainable use of soil biodiversity:

- A clear definition for “good ecological or biological status” of soils is needed
- There is the need for a holistic monitoring of (European) soil biodiversity
- Clear and binding definitions of sustainable soil management practices have to be developed
- Aiming to permanently and reliably sequester carbon using so called “Carbon farming” is not possible without critical impacts on the physical, chemical or biological status of soils

Introduction

Soils lay the ground for all terrestrial life and land use. Growth of a diverse and productive flora and related fauna depends on countless ecosystem services that are clearly related to soil functions¹. However, these functions are not solely related to soil types. Ecosystem services are supported and provided by a highly diverse and active soil life. For instance, productive agriculture strongly depends on soil fertility which is in part provided by soil biodiversity. Soil organisms are responsible for nutrient turnover by shredding, decomposing and mineralizing detritus. Further, they create a resilient soil matrix, that allows good aeration, water infiltration and retains water as well as nutrients and makes it available to the cultivation of vital, robust and productive crops.

In the context of climate change mitigation and adaptation the carbon sequestration potential of soils comes into focus. Again, soils are not able to sequester carbon only based on their physical and chemical status. It is the active and diverse soil life that contributes to formation of stable organo-mineral compounds, improving soil structure and contributing to the extraction of carbon dioxide from the atmosphere.

At European level the main pressures and threats affecting soil health have been identified in the recent EEA soil report on Soil Monitoring in Europe² and include organic carbon loss, nutrient loss, acidification, pollution, erosion, compaction, sealing and soil biodiversity loss. Despite major gaps in our records of soil taxonomic, genetic and functional diversity, there is growing evidence of a decline in soil biodiversity. Accordingly, we are at risk of losing a great share of all its essential ecosystem services. This risk is acknowledged at national, European and also global level.

¹ FAO (2020), State of knowledge of soil biodiversity - Status, challenges and potentialities, <https://www.fao.org/documents/card/en/c/cb1928en>

² EEA (2023), Soil monitoring in Europe – Indicators and thresholds for soil health assessments, <https://www.eea.europa.eu/publications/soil-monitoring-in-europe>

Global Framework

At COP15 of the UN Convention on Biodiversity (CBD) parties adopted a plan of action for the conservation and sustainable use of soil biodiversity³. This plan of action acknowledges the importance of soil biodiversity for agriculture, food security and climate change adaptation and mitigation and aims to promote its conservation. In a nutshell, it identifies four key elements to achieve this aim that are directly linked to activities within ENCA or the European Union:

1. Policy coherence and mainstreaming

The importance of the conservation, restoration, sustainable use and management of soil biodiversity needs to be mainstreamed and reflected in broader national and European policies and strategies. Tools and legal measures already exist in European directives, but need to be identified, specified and better implemented. In terms of the European Union, ongoing activities in the preparation of an ambitious soil health law are of special importance.

2. Sustainable soil management practices

Soils under agriculture or forestry use need to be managed sustainably, preferably following integrated pest and nutrient management as well as agroecological principles. This will protect and maintain the functionality of soils to support food and fibre production. Where necessary the status of degraded soils should be restored, preferably via nature-based solutions. Risks to soil biodiversity should be assessed considering long term and cumulative effects of all pollutants, including microplastics, in soil systems. These considerations should inform the European Union's ongoing negotiations for the development of a sustainable use of pesticides regulation (SUR), and be integrated more consistently in the future Common Agricultural Policy (CAP).

³ CBD/COP/15/L16 Biodiversity and Agriculture (2022),
<https://www.cbd.int/meetings/COP-15>

3. Awareness-raising, sharing of knowledge

Appreciation for the value and awareness of the consequences of loss of soil biodiversity needs broader public reach. Especially farmers and foresters as well as spatial planners, developers, urbanists, elected representatives and the building sector need to develop a greater awareness of soil biodiversity and the ecosystem services it supports. Best practice examples need to be promoted amongst practitioners and made available for professional education and peer-to-peer learning.

4. Research, monitoring and assessment

Research on understanding and assessing the threats to soil biodiversity needs to be extended to reach a better understanding of the causes for the decline of soil biodiversity. This should include appropriate consideration on the cumulative and long-term risks of pollutants like pesticides. Further, research and development should focus on integrated soil management approaches for the successful conservation and promotion of soil organisms.

To allow for a conclusive assessment of soil biodiversity, the establishment of an in-depth monitoring of soil organisms is essential. Harmonized definitions, standard baselines and indicators need to be developed and shared. Capacities in soil biodiversity taxonomy assessment remain limited and need to be increased and amended through the development of innovative technical approaches to monitoring.

ENCA fully supports the CBD Action Plan for the conservation and sustainable use of soil biodiversity and expresses its willingness to use the strength of its network to facilitate a successful implementation of the action plan. By 2030 the proposed actions should already show their first results for an effective conservation of soil organisms. ENCA acts as a platform to exchange knowledge on the assessment and monitoring of soil organisms and experiences in its conservation and sustainable use. As soil diversity can be very specific to soil type and climate conditions, the broad spectrum of soil-ecosystems supervised by ENCA organisations can be seen as a great opportunity to identify site-specific actions for soil biodiversity conservation.

European Implementation

ENCA acknowledges the efforts by the European Commission to address the importance of an active and diverse soil life in the *Biodiversity Strategy for 2030* and the *EU Soil Strategy for 2030*. The Strategies aim to reduce erosion, increase organic matter content and soil fertility. Integrated nutrient and pest management aim to reduce the pollution and risk to soil organisms by half. Further, the EU Soil Health Law will set a new legal basis for the protection of soils and the conservation of its associated biodiversity. A sound monitoring framework will need to be established that allows for an assessment of progress and the success of the proposed measures. In order to make the Soil Health Law an effective tool for the conservation and sustainable use of soil biodiversity ENCA would like to raise the following points:

Good ecological and biological status

The Soil Health Law needs to provide clear definitions on “good ecological or biological status” of soils. Soils as habitats are very diverse and under different climate conditions and management regimes will host highly specific soil species communities. There is limited data on the current status of soil biodiversity across EU countries. A holistic monitoring of European soil biodiversity is not yet in place. It will be challenging to identify suitable indicators for soil biodiversity and develop monitoring protocols that are representative for all European soils.

To meet this challenge ENCA suggests the definition of a good ecological and biological status of individual soil habitats as the status that can be achieved under the best and most soil-conserving soil management practices known with current scientific knowledge. This would allow EU member states to define indicators and monitoring activities that best suit their individual soil conditions.

Sustainable soil management practices

The above-mentioned approach for the development of good ecological and biological status of soils strongly depends on a clear and binding definition of sustainable soil management practices. All management practices labelled as sustainable should enable soil to reach or conserve its best possible physical, chemical and biological

status⁴. Practices that may be beneficial to one status but detrimental to another, or other properties of the environment (e.g. air quality, water quality, etc.) cannot be considered as sustainable. As an example, no or minimum tillage systems, that may be good for the physical status of soils, may be detrimental to their biological status when used systematically in combinations with total herbicides. Accordingly, only soil conserving cultivation practices that avoid the general application of total herbicides should be labelled as sustainable.

Critical view on carbon farming

The increase of organic matter contents in agricultural soils is, in principle, beneficial for soil biodiversity and support carbon sequestration. An active and diverse soil life can make use of organic matter and integrate it into the soil matrix increasing soil fertility and helping to promote good soil structure.

However, in line with the deliberations on sustainable management practices, ENCA would like to express its concerns regarding the concept of carbon farming. Organic matter in soils is subject to biological degradation and is thus part of the mineral and carbon cycle. Activities that aim to permanently store additional carbon in the soil matrix need to decouple organic carbon from biological degradation. This will not be possible without critical impacts on the physical, chemical or biological status of soils. Furthermore, not all soil habitats are suitable for the permanent increase of soil organic matter without negatively impacting the habitat quality. Lastly, increasing the stable fraction of organic carbon in soils based on the sustainable use of soil biodiversity is a repetitive task, depending on a continuous supply of organic matter and soil conservation management. Contrarily, a single incident can provoke the release of carbon previously stored laboriously. Accordingly, efforts should be increased to enrich agricultural soils with organic carbon for the benefit of soil biodiversity, but should not be considered in the context of atmospheric carbon removal, which is a separate proposal currently discussed at EU level.

⁴ BfN (2021). Biodiversity in agricultural used soils: Threats and options for its conservation in Germany and Europe. SOIL ORGANISMS, 93(1), 1–11