

## POLITICAL STATEMENT

## Soil and biodiversity – Demands on politics\*

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### 1. Introduction

During the conference 'Rediscovering the soil with Alexander von Humboldt. Soil and Biodiversity - Everything is connected with everything' in Berlin on December 5, 2019, a political statement was prepared as a major result of the discussion. Many important German organisations for nature conservation and soil protection (Tab. 1) signed this political statement in the spring of 2020. A translated version of 'Boden und Biodiversität – Forderungen an die Politik' is presented here, as it addresses the German and the EU common agricultural and conservational policy.

\* Results of the conference 'Rediscovering the soil with Alexander von Humboldt. Soil and Biodiversity - Everything is connected with everything' on 5 December 2019 in Berlin

### 2. Key player soil organisms

Healthy soils filter water, making it suitable for drinking, protect us from flooding, provide nutrients, and allow food to grow. It can do all of this and more only because benevolent creatures under our feet work together like the wheels in clockwork. They include bacteria, fungi, ants and other insects, earthworms, small mammals, and many more (Xylander et al. 2015). One teaspoon of soil contains more organisms than there are people on earth (Orgiazzi et al. 2016).

The countless microorganisms and soil animals crush and recycle leaves and other dead plant material. An important product of this process is humus, the most precious part of fertile soil. Humus contains nutrients, stores water, and stabilises the soil structure. The soil also stores carbon in the humus, thereby reducing the amount of the climate-relevant greenhouse gas carbon dioxide in the atmosphere. Thus, the protection of soil biodiversity also aids in climate protection.

**Tab. 1.** German organisations (and their English title) which signed the statement.

Kommission Bodenschutz beim Umweltbundesamt (KBU)	Soil Protection Commission at the Federal Environment Agency
Bundesamt für Naturschutz	Federal Agency for Nature Conservation -
Bund für Umwelt und Naturschutz Deutschland e.V.	Association for the Environment and Nature Conservation
Bundesverband Boden e.V.	German Soil Association
Deutsche Bodenkundliche Gesellschaft	German Soil Science Society
WWF Deutschland	World Wide Fund for Nature Germany
Zukunftsstiftung Landwirtschaft	Future Foundation for Agriculture
Senckenberg Museum für Naturkunde Görlitz	Senckenberg Museum of Natural History Görlitz

Bacteria and fungi release nutrients from organic residues; earthworms, springtails, mites and other soil animals accelerate this process. The excretions of earthworms form stable compounds between the organic and inorganic components of the soil. Soil organisms form tunnels and clefts in the soil necessary for its oxygenation and also allowing rainwater to seep away faster. In many cases, microorganisms can break down organic pollutants and thus reduce the risk to humans and other living organisms. The more diverse a soil community is, the more resilient the soil is to e.g. the effects of intensive land use and the consequences of climate change such as prolonged drought.

The soil is a powerful and indispensable habitat, but also highly sensitive for organisms. It only functions if its species composition is diverse and intact.

### 3. Soil diversity creates biodiversity

The services provided by the soil and its organisms are essential for agriculture and forestry and therefore integral to our nutrition, well-being, and economy. The composition of the organisms living in the soil varies greatly and depends on numerous natural factors, such as the content of sand, clay and humus, but also on the type of land use and soil management. For example, the conversion of grassland into arable land greatly reduces the amount of organic carbon stored in the soil. Farming practices, such as the removal of crop residues from fields, prevent the accumulation of organic material that is important for soil fertility from being processed naturally and nutrients from being replenished (Orgiazzi et al. 2016).

Soil is also very important for biodiversity 'above the turf'. Soil organisms promote plant growth, on which the food webs of all land habitats are based. In addition, many insects, which are indispensable as pollinators of our crops, live temporarily in the soil.

Sustainable land use promotes and preserves soil biodiversity and also maintains the soil functions that are essential for human existence.

## 4. Loss of soil biodiversity

The diversity of soil life is mainly affected by intensive agriculture, as it takes place on 45 percent of European soils - with the few exceptions of organic farming (Barz et al. 2015). Frequent use of heavy machinery compresses the pores and cavities in the soil and destroys the habitat of larger and medium sized soil animals. This results also in waterlogging and oxygen deficiency, which leads to a decrease in soil biodiversity. Simplified crop rotations and the use of pesticides also worsen the living conditions for many soil organisms.

The extensive sealing of our soils with asphalt and concrete in the course of increasing urbanisation and land take is increasingly suffocating soil life. In Germany, for example, around 46 percent of settlement and traffic areas are sealed, i.e. built upon, concreted, asphalted, paved or otherwise reinforced (UBA 2020). The growth in settlement and transport areas has been at the expense of agriculturally used land. This overexploitation deprives us and our children from sustainable and productive agriculture and forestry.

### Four steps for more diversity in and on the soil - Demands on politics

1. *The policy supports joint action between soil protection and nature conservation and agriculture, forestry and water management (Deutscher Bundestag 2019)*

Previous approaches and ongoing political processes, such as the action programme for insect protection, the arable farming strategy, the pesticide reduction strategy,

the Future Commission on Agriculture, the future strategy for organic farming and the nature conservation-compatible design of the future common agricultural policy must be coordinated. Against the background of sustainable land use, the various interests of soil, water, and nature conservation must be carefully weighed against each other. The protection of soil biodiversity, which has been widely neglected in the past, and the promotion of soil ecosystem services as a whole, must be given more attention. The long-term preservation of soil life and the associated soil fertility must take priority over short-term increases in productivity.

Ultimately, we call for suitable framework conditions within the EU Common Agricultural Policy and at national levels, which improve soil biodiversity and thus the soil as a basis for life, including for humans. In detail:

- Site-adapted soil management based on crop rotation diversity, year-round soil cover, no pesticide use, priority for organic fertilization, and an increase in organic farming. The principles of good agricultural practice must be adapted in such a way that they guarantee sufficient protection of the environment, especially of soil biodiversity.
- A ban on the ploughing up of grassland and the promotion of the conversion of arable land back into permanent grassland in suitable locations. Permanent grassland protects the soil as one of the most important production bases of agriculture, provides a habitat for numerous animal and plant species depending on the use of the grassland. Also, it is the most important carbon store next to peatland and wetlands.
- Preservation of remaining and promotion of new ecological priority areas under the premise of biological diversity on at least ten percent of the land area as well as the targeted development of organic farming through attractive support mechanisms. These measures promote species richness in the agricultural landscape and protect adjacent water bodies and drinking water from dangerously high inputs of nutrients, pesticides, and pharmaceuticals (KBU 2016).
- Within the EU's Common Agricultural Policy, a move away from a premium per hectare towards a steering premium with the aim of orienting management towards the preservation of the basis of life, while taking nature and environmental protection concerns into account. This also includes the creation of permanent woodland structures in cleared agricultural landscapes and increasing the proportion of forest in regions with low forest cover.

## *2. The EU takes into account the UN Sustainable Development Goals (SDGs) in its soil protection strategy and in a soil-protecting EU agricultural policy*

The destruction of the soil through settlement and transport as well as intensive agriculture destroys biodiversity and its functions. Policy programmes aimed exclusively at insect species or specific locations, such as bogs, are insufficient. Rather, rethinking is needed to orientate conservation goals and strategies, especially in agriculture, to sustainability and functionality. In the new funding period, soil protection must be an objective of EU agricultural policy as well as the New Green Deal and the Farm-to-Fork strategy. As a first step, it is necessary to formulate a national and a European soil protection strategy with concrete objectives, measures and funding programmes, as called for by the European Commission's "Soil health and food" mission. In the medium term, the discussion on an EU soil framework directive must be resumed.

## *3. Politicians develop awareness for the soil as a limited resource.*

Politicians are developing a greater awareness of the value of soil as a sensitive and indispensable habitat and as a limited resource as well as getting involved with soil in public. Political action to protect soil can only be successful if all actors make their contribution. Political measures must therefore be supplemented by measures of education, communication, and participation, with the aim of bringing together the views and approaches of different groups, enabling participants to form informed opinions and opening up the most concrete perspectives for action possible (Bebek et al. 2017).

## *4. Reference data for soil health are available.*

The diversity and vulnerability of soil life is not yet fully known. It is largely unexplored how many species are threatened with extinction or endangered by misuse of the soil. Existing monitoring programmes and digital documentations (e.g. the data warehouse Edaphobase, see [www.edaphobase.org](http://www.edaphobase.org), Burkhardt et al. 2014) urgently need to be expanded to include soil biological records, networked more closely with one another and evaluated with regard to the functions of soil organisms and their threats.

## **4. Acknowledgements**

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