WEBINAR

Biodiversity science synthesized for good living and sustainable development

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Future Earth is a **global network** supporting collaboration between researchers and stakeholders from all different regions, backgrounds, and sectors who are working to generate actionable, solutions-oriented knowledge needed to support transformations towards sustainability.

Future Earth’s focus is:
- Facilitating research and innovation
- Building and mobilizing networks
- Shaping the global narrative
18 German research institutes from the Leibniz Association from environmental sciences to the humanities conducting research on drivers of biodiversity loss, nature restoration and the multitude of human-environment relationships.
Authors from universities and other scientific institutions
From the Kunming-Montreal Global Biodiversity Framework (GBF) to National Biodiversity Strategies
How can science support the process?

Science can provide key knowledge
10 Must Knows from Biodiversity Science 2022
10 Must Knows from Biodiversity Science 2024
7 Protecting land and resources

Biodiversity and the protection, restoration and development of natural resources should be reflected in all land-use discussions, decisions and spatial planning processes at all levels, starting with international and national conservation area planning (including their interconnections (biotopes networks) and down to regional and local spatial planning.

The restoration of degraded areas should begin immediately and must be accelerated.

Protected areas and interconnections are the backbone of biodiversity conservation. The weakening of existing protected areas and landscape-protected areas from other uses, such as agricultural fields, must be prevented. New protected area implementation should be enhanced, and existing and new areas must be effectively managed.

Integrative cross-sectorial biodiversity management should also be enforced beyond protected areas, e.g., in agricultural landscapes and forests (Muellendorf, 2014).

Since 2022, the social debate on transformation has intensified once again, and policymakers and planners are facing with increasing and often conflicting courses of action. The conservation of biodiversity and natural resources must have top priority in land use and spatial planning decisions.

To implement the GEF targets, spatially designated and cross-sectorially integrated targets must be required, particularly at local and national levels. Biodiversity protection must be integrated into land-use decisions across sectors and stakeholders and made binding in spatial planning. Avoiding adverse impacts on biodiversity should be given priority over other interests. Current accelerated legislative initiatives that weaken species protection laws in the transport, industrial, and renewable energy and building sectors and that limit impact regulation to actual compensation or compensative payments are heading in the wrong direction (cf. results of the German government coalition committee of March 2023). Indeed, exploring sustainable development synergies should have priority. This and, it is estimated, a shift in existing agricultural legislation, which is also called for in Germany’s Action Plan Biodiversity Protection 2019-2023 (Muellendorf and Scholze, 2021). On 27 February 2023, the German Parliament passed the EU Nature Restoration Act. This law now must be implemented with ambitious national standards. Potential areas for the restoration of ecosystems must be identified, saved and developed as a further step to regularly monitor whether GEF targets are being achieved.

Central message

Since 2022, the social debate on transformation has intensified once again, and policymakers and planners are facing with increasing and often conflicting courses of action. The conservation of biodiversity and natural resources must have top priority in land use and spatial planning decisions.

Explanation of key findings

3x

268,721

3 key figures

Since 2022, the social debate on transformation has intensified once again, and policymakers and planners are facing with increasing and often conflicting courses of action. The conservation of biodiversity and natural resources must have top priority in land use and spatial planning decisions.

The protection of land and natural resources is an indispensable, essential part for sustainable transformation processes in society, politics, economy and planning. Clashes of interests in the valuation and use of natural resources should be resolved through integrated approaches for climate change mitigation and biodiversity protection.
Biodiversity protection must be integrated into land-use decisions across sectors and substantiated and made binding in spatial planning.

**Recommendations for political decision-makers**

1. **Call for action:** It is insufficient to aim for the lowest common denominator. Rather, relevant actors must assume political responsibility for decisions taken to ensure the consistent protection of biodiversity and land-water ecosystems as a form of biodiversity responsibility. Integrative, cross-sectoral strategies are available as part of the National Biodiversity Strategy. **The Garden Nature, Green Deal, the potential NaturaFischgerüst, and various laws and drafts (laws).** These strategies should be consistently applied. e.g. the required legal, personnel, financial and technical resources should be provided and users’ responsibilities and land-related objectives need to be defined.

2. **Synergistic action:** Resource protection works best when and if there is a long-lasting majority regarding the protection of biodiversity creating synergies with other sustainable development aspects. A goal-oriented, well-founded debate on the protection of natural life-support systems is not possible if contrary political goals are played off against each other. e.g. within the debate on biodiversity and resource protection like the use of wood (Machtwissen). It is therefore important that political goals, plans and programmes address potential conflicts and resolve them already in advance.

3. **Biodiversity mainstreaming in all sectors:** The protection of natural resources (land, water, soils, air, biodiversity and landscapes) as a cross-sectional task must be primarily reflected in all decision-making processes – the balance in considerations must be shifted in favour of biodiversity and ecosystem services – and prioritised for sustainable development across all sectors.

**Recommendations for society**

1. We all benefit from the conservation of natural resources and biodiversity – building on nature can become a synergistic driver for innovation and new jobs.

2. We can all contribute to objectifying the debate. We all are responsible and we all can do something to save land, preserve natural resources and protect and develop biodiversity.

3. We can all work together to preserve our natural resources. We need positive narratives where people can find their own needs and hopes reflected. Society must overcome existing stereotypes, e.g. the false dichotomy of nature conservation versus agriculture. We have to develop fresh visions of a shared and healthy future as a prerequisite for new alliances.
Among terrestrial ecosystems, peatlands are exceptionally well suited to combine biodiversity conservation and climate protection. Many of Germany’s currently drained peatlands used by agriculture can be rewetted and still allow sustainable agriculture (paludiculture). Still, recovery of peatland biodiversity may take several decades.

Rewetted temperate fen peatland sites (open red) are more variable than near-natural sites (filled blue) and many rewetted sites are outside the near-natural range of variation. (Source: Kreyling et al. 2021)
Many actions that conserve biodiversity also have positive effects on climate change mitigation and adaptation, while far fewer actions that protect climate help biodiversity.
Recommendations ...

Recommendations for political decision-makers

2. Rewetting peatlands has clear advantages for climate, water cycling and biodiversity, and avoiding continued CO₂ emission. Facilitating change by setting clear rewetting targets in the EU Nature Restoration Law, substantiated by adequate funding and incentivising new value chains from wet peatlands while co-designing implementation with all actors involved in the transition process is recommended.

Recommendations for society

1. Biodiversity conservation supports ecosystem resilience and adaptation, thus climate protection. Raise awareness and address concerns in the transformation for protecting, restoring and sustainably using wetlands, land- and seascapes by involving all societal actors (>MustKnow8).
The protection and restoration of biodiversity creates synergies with climate mitigation. Resilient nature means good quality of life for all.
Considering undiscovered biodiversity
90% of the biodiversity is unknown

There is hidden biodiversity in neglected spatial and temporal context, including organisms invisible to the naked eye, beneath the surface in soil, freshwater, or marine environments, or invertebrates active at night.

12% Canada possesses one of the largest renewable supplies of freshwater in the world. 12% of its freshwater species are known to be endangered, threatened, or at risk. About 40% lack sufficient data to enable their status to be assessed. 

50% of the flying insect diversity belongs to only 20 families regardless of continent, climatic region, and habitat type. The same families contain many “hidden taxa” in that they suffer from increasing taxonomic knowledge gaps. 

59% A recent review of the biodiversity literature indicates that soil harbours approximately 59% of all species on Earth, with organisms ranging from microbes to mammals. This is about double the previously estimated amount.
Is biodiversity an understudied field? Do we need more research?

**Yes, we need more research!**
On soil, sediment, freshwater, marine areas, urban spaces and on stressors such as noise and light at night

**Yes, we know enough!**
To act immediately and improve measures for conservation and protection of biodiversity and habitat. Consequently, improving nature based climate protection
Solutions

**Ecosystem-based habitat management** rather than single-species/habitat-focused practices

**Indicators** for noise and light pollution are needed, existing indicators need to be enforced and urban areas need to be included into **area protection targets**

**Modern tools** like high-throughput DNA sequencing and AI can improve the monitoring

**FAIR data principles** can help to accommodate knowledge gaps and improve monitoring

**Inter- and transdisciplinary research** needs to be supported and results applied
3. Considering undiscovered biodiversity

Recommendations …

Recommendations for political decision-makers

2. The monitoring needs improvement. Thus, the implementation of a nationwide standardised monitoring of biodiversity (e.g. Darwin Core Standard) is necessary, using FAIR principles in order to find and reuse data when new insights into hidden biodiversity are discovered (GBF targets 14, 20, 21).

Recommendations for society

3. Don’t wait for regulations. Reducing stressors, for example pesticides, noise, and light at night, are useful measures to protect organisms we normally do not perceive. If these decisions are made without political pressure, the solutions can act as bottom-up best-practice examples for changing societal behaviour (GBF target 7).
The acceptance that we only understand a small part of biodiversity is a first step to improve conservation measures.
Linking linguistic, cultural and biological diversity

Inari Sámi, a language spoken in Finland, has six different words for whitefish (Coregonus lavaretus). Oral stories and knowledge provide baselines for the (ecological) knowledge on management and restoration of natural pastures.

Germany has comparatively few native languages, eight from a single language family (the Germanic languages German, Danish, North and Saterland Frisian, the Slavic languages Upper and Lower Sorbian, the Indo-Aryan language Romani) and the German Sign Language. Some of them are highly regionally diversified in dialects. In comparison, the Southwest Amazon is about the same size but has over 50 languages representing seven language families and harbours ten isolates.

Of the utmost importance to the conservation of Indigenous and local knowledge are language maintenance and revitalisation programmes which support Indigenous and local communities, as well as the documentation and analysis of Indigenous and local languages as the primary carriers of such knowledge that links to and sustains biodiversity.

There are about 7,000 known languages. If we do not intervene, we could lose 1,500 by the end of this century. That would amount to at least one language per month.
Germanic languages
- German
- Low German
- Danish
- North Frisian
- Saterland Frisian

Slavic languages
- Upper Sorbian
- Lower Sorbian

Indo-Aryan language
- Romani

German Sign Language
- DGS

The German context

Germany has comparatively few native languages. Except German Sign Language, they all belong to branches of the same *Indo-European language family*.

Some of these languages are highly regionally diversified in dialects.

In comparison, the *Southwest Amazon* is about the same size but has over 50 languages representing seven language families and harbours ten isolates.
Endangered ethno-linguistic diversity in the Southwestern Amazon
German and Frisian dialects

Source: Wiesinger, 1983
Plant diversity and language distribution
(Source: Stepp, 2004)
Recommendations ...

**Recommendations for political decision-makers**

1. Campaign for the *Indigenous and Tribal Peoples Convention (ILO 169)*[^32] to be ratified and applied by as many countries as possible. It is the only convention in the world that legally protects the rights and cultures of indigenous peoples and thus biocultural diversity.

**Recommendations for society**

3. Nation states often try to impose monolingualism. However, multilingualism is the usual situation in human societies[^33],[^34]. Supporting multilingualism is one of the main strategies to preserve Indigenous and local languages and opens avenues for discovering new descriptions and views of nature, historic story-telling, shared experiences and traditional practices, thereby supporting ecoliteracy.
In order to protect biodiversity, you must also protect the territories of the IPLCs and respect their languages and cultures.
Releasing transformative change through international collaboration and Education for Sustainable Development
Although impacts on biodiversity are local in nature, drivers of biodiversity change are linked globally.
Market share for investments highly concentrated:

large investment companies have the power to (de)stabilise the Earth system

business, industry, and finance institutions need to track their impacts on biodiversity along value chains and in investments

National Biodiversity Strategies and Action Plans need to include guidance for business and finance to internalise currently external costs to biodiversity

regulations are required to support implementation

The education sector is a primary change agent for:

**raising awareness** of biodiversity

**co-producing knowledge** on the status of biodiversity

**Education for Sustainable Development (ESD)**

galvanising behavioural change

**transformative learning approaches** across all age and social groups, using various formats

It should be implemented across all levels of education.
Citizen and Community Science:

- promotes and deepens the understanding of science and scientific activities
- highlights importance of biodiversity and impacts of the loss of biodiversity
- important part of ESD development

Citizen and Community Science projects:

- support collection of monitoring data
- build stronger connections between citizens and scientists
- integrate new sources of information and knowledge for biodiversity research
Recommendations ...

Recommendations for political decision-makers

2. Strong international collaborations including scientific cooperation and technology transfer are the foundation to understand the drivers of biodiversity change, and track the effectiveness of targeted actions to conserve biodiversity, for example in the control of invasive species.

Recommendations for society

3. Indirect drivers such as investment in production, trade and financial flows, but also consumption patterns contribute to biodiversity loss and climate change. It is vital that business, industry, and finance institutions track their impacts on biodiversity along value chains and in investments.
Due to the complex nature of biodiversity loss, stopping it requires connecting science, politics, economy and society and enhancing education of different formats for sustainable development across all age and social groups.
Let's shape our future together

Want to connect with us and be #PartOfThePlan? Then write to: eva.rahner@pik-potsdam.de or scan the QR codes.
Our approach

**Idea**
10 globally & nationally relevant biodiversity topics with geographical perspective: Germany in Europe (global)

**Team**
Lead authors organised writing teams & writing process; keyword-based literature search: 2021-2023

**Design**
60 experts from science, policy & society reviewed 10MustKnows24; design, translation & publication (DE & EN)

- Virtual finding & update workshops
- Writing workshop
- Many virtual jour fixes, group meetings, calls & emails

Our goals

*Support the German National Biodiversity Strategy 2030* (and related national strategies) according to the 23 global Kunming-Montreal GBF goals (2022) with important scientific facts

*Stimulate science-policy-society dialogues and actions* to accomplish the urgent need of a socio-ecological transformation (until 2030)