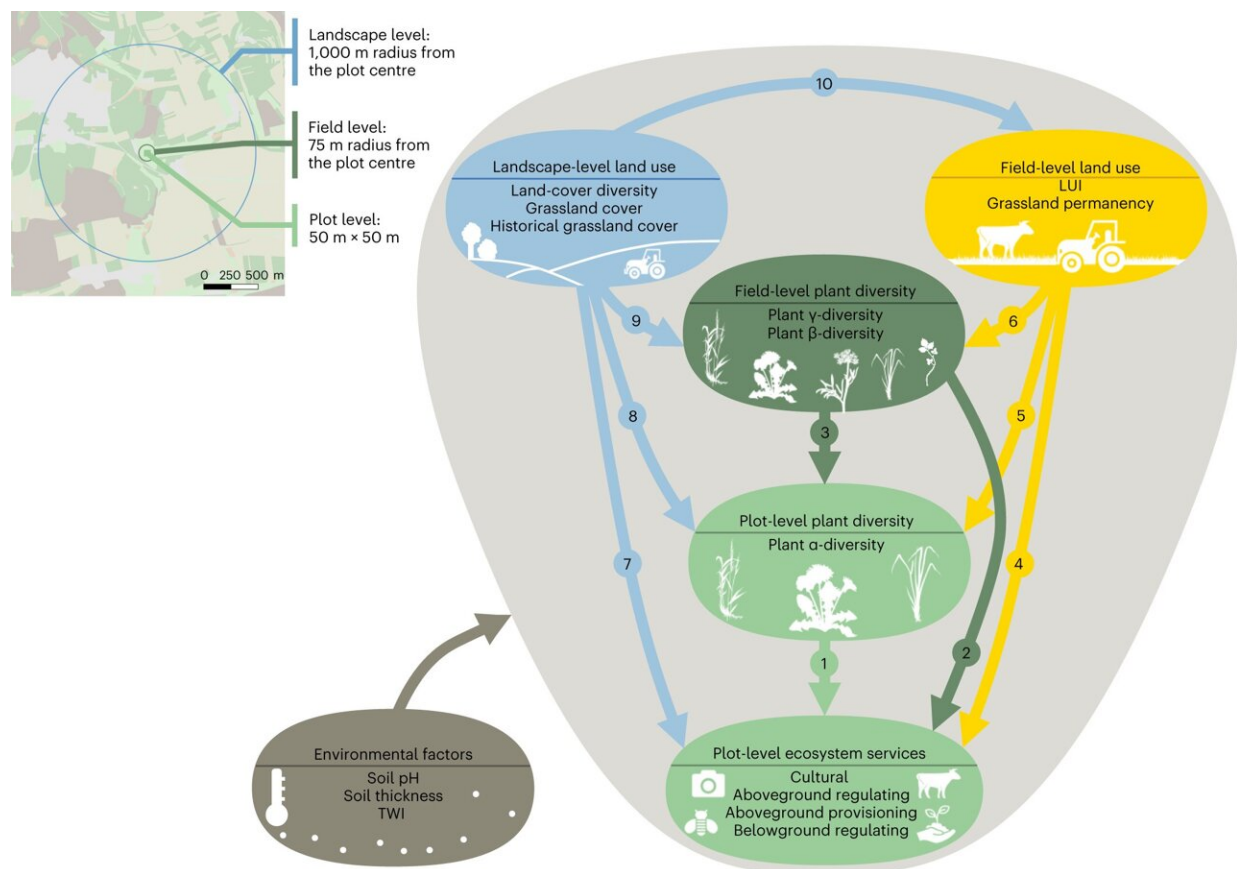


# Beneficial and beautiful: Biodiversity of meadows and pastures can be an asset for nature, agriculture, and tourism

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Conceptual framework of the relationship between landscape- and field-level land use, field- and plot-level plant diversity and plot-level ecosystem services. Credit: *Nature Ecology & Evolution* (2022). DOI: 10.1038/s41559-022-01918-5

In a long-term study, an international team led by INRAE and Senckenberg researchers Dr. Gaëtane Le Provost and Dr. Peter Manning has demonstrated the importance of grassland biodiversity for a wide range of ecosystem services and various stakeholder groups.

The study, published today in *Nature Ecology & Evolution*, is the first to expand the view to a total of 16 ecosystem services—from ecological to cultural—and to examine the biodiversity of agricultural meadows and pastures on a large scale. The researchers show that a high plant diversity can benefit local actors—from tourism to agriculture.

Where species-rich meadows provide habitat for bees and other insects, ecosystem services such as pollination or natural pest control offer benefits not only to nature but to agriculture as well. But what about less obvious ecosystem services provided by organisms below ground that affect soil quality? And exactly how does a high biodiversity affect the experience of nature, which also plays an important role in local tourism as a leisure activity and recreational opportunity?

To gain a comprehensive picture of these biodiversity dynamics, an international research team led by Dr. Gaëtane Le Provost and Dr. Peter Manning from the Senckenberg Biodiversity and Climate Research Center in Frankfurt studied agricultural meadows and pastures in various rural regions in Germany.

In the process, they evaluated data that were collected continuously since 2006 as part of the "Biodiversity Exploratories" project for areas in the Swabian Alb, the Hainich-Dün region of central Germany, and the Schorfheide-Chorin Biosphere Reserve in Brandenburg. "The areas differ in climate and topography and at the same time serve as examples for different types of typical grassland use in Central Europe," explains Le Provost.



The opportunity for birdwatching – here in the Schorfheide in Brandenburg – is one of a total of 16 ecosystem services that were examined as part of the study.  
Credit: Peter Manning / SGN

She continues, "We studied a total of 150 grassland areas during the period from 2006 to 2018 and for the first time examined 16 different ecosystem services—from forage quality and pollination to numerous [soil quality](#) factors such as carbon storage or groundwater recharge, to so-called cultural ecosystem services that affect our experience of nature."

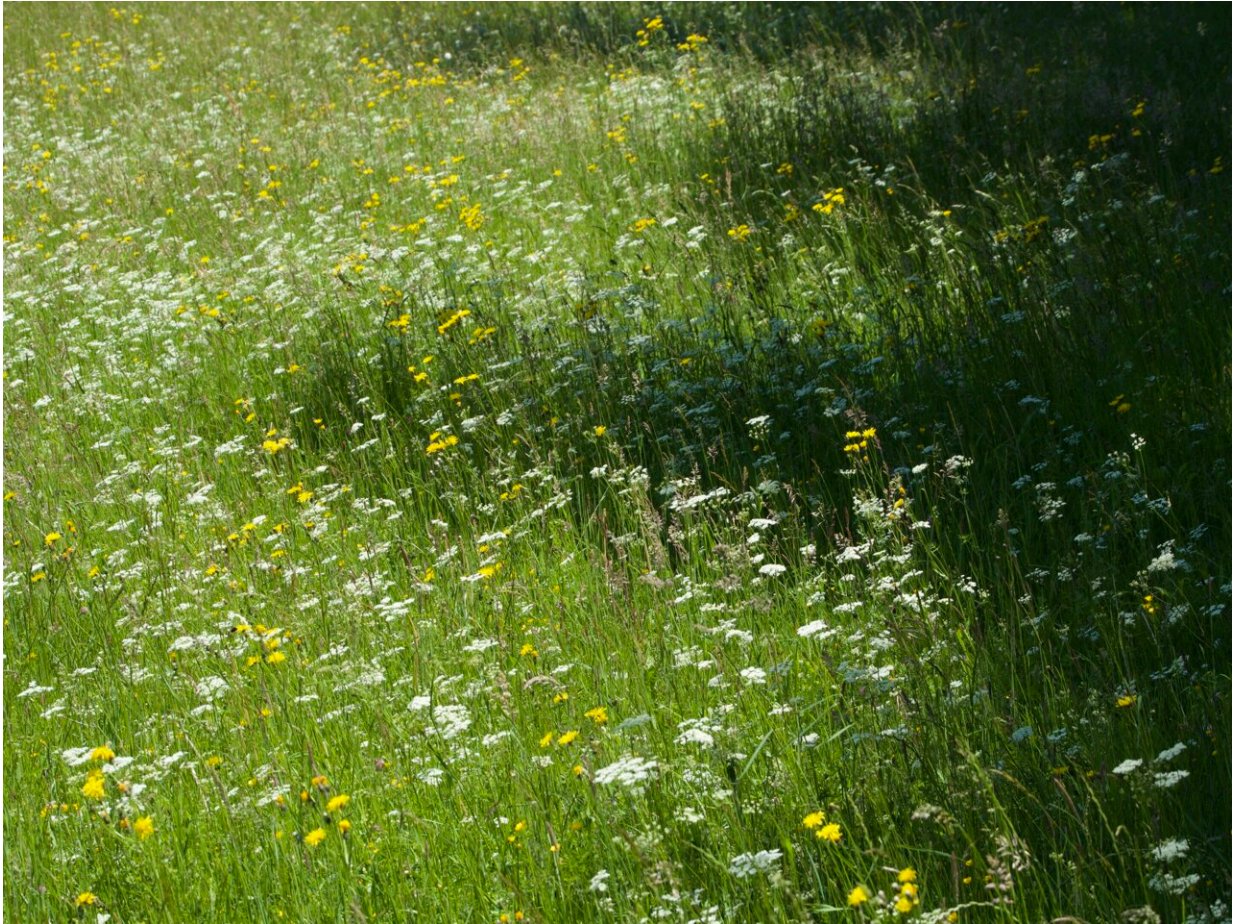
"For example, the opportunity for birdwatching—or simply the therapeutic sight of a lush meadow in bloom and the wealth of acoustic stimuli provided by a species-rich grassland through birdsong and other nature sounds. We were able to demonstrate that high plant diversity has a positive effect on a large number of ecosystem services."

For the first time, the researchers also examined the significance of ecosystem services for various local stakeholders in their study. In cooperation with the Institute for Social-Ecological Research (ISOE) Frankfurt, [local residents](#) as well as representatives of nature conservation organizations and the agricultural and [tourism industries](#) were invited to attend workshops and were subject to representative surveys.

"We found that, without exception, all of the groups surveyed could benefit from a high level of biodiversity—from local residents to the tourism industry," reports Sophie Peter, a research associate at the ISOE.

Lastly, the research team was able to demonstrate the benefits of high plant diversity not only for smaller areas but considered the [biodiversity](#) dynamics in relation to the larger environment.





The therapeutic experience of a natural meadow in full bloom offers added value as a cultural ecosystem service for various local groups – from residents to the tourism industry. Credit: Peter Manning / SGN

"The fact that the plant diversity of the surrounding area has an influence on the provision of various [ecosystem services](#) is an important basis for local decision-makers," says Manning. "Political decisions on land use are usually made on a large geographic scale. Our data show that even at these large scales, a high plant diversity offers benefits to all involved parties!"

**More information:** Gaëtane Le Provost et al, The supply of multiple

ecosystem services requires biodiversity across spatial scales, *Nature Ecology & Evolution* (2022). [DOI: 10.1038/s41559-022-01918-5](https://doi.org/10.1038/s41559-022-01918-5)

Provided by INRAE - National Research Institute for Agriculture, Food and Environment

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